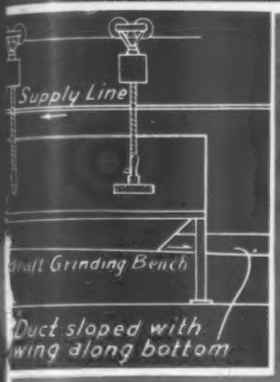
PRE-CONVENTION ISSUE April 1943

THE FOUNDRY

FIFTY-FIRST YEAR



THE *SAFE* METHOD OF COLLECTING MAGNESIUM DUST

During the past two decades Schneible Multi-Wash Collectors have, in their numerous installations, coped with every foundry dust and fume condition, and with minimum operating and maintenance costs.

When war-scale magnesium production brought with it an entirely new dust problem, Schneible was ready with service-tested equipment. Magnesium dust embodies serious hazards and, when mixed with water, further danger is created. Schneible magnesium dust collecting installations are safe, because they employ spent cutting oil, or other high flash oil, as the collecting medium. Complete product recovery is also provided.

Whatever metals you pour, an investigation of Schneible dust collecting systems is worthwhile.

CLAUDE B. SCHNEIBLE COMPANY

3953 Lawrence Avenue, Chicago, Illinois

Engineering Representatives in Principal Cities

Standard Grinder Hood
Main Duct
Spray Nozzle
Bottom of hood & Branch covered with flowing oil
Grinding Hood for Magnesium

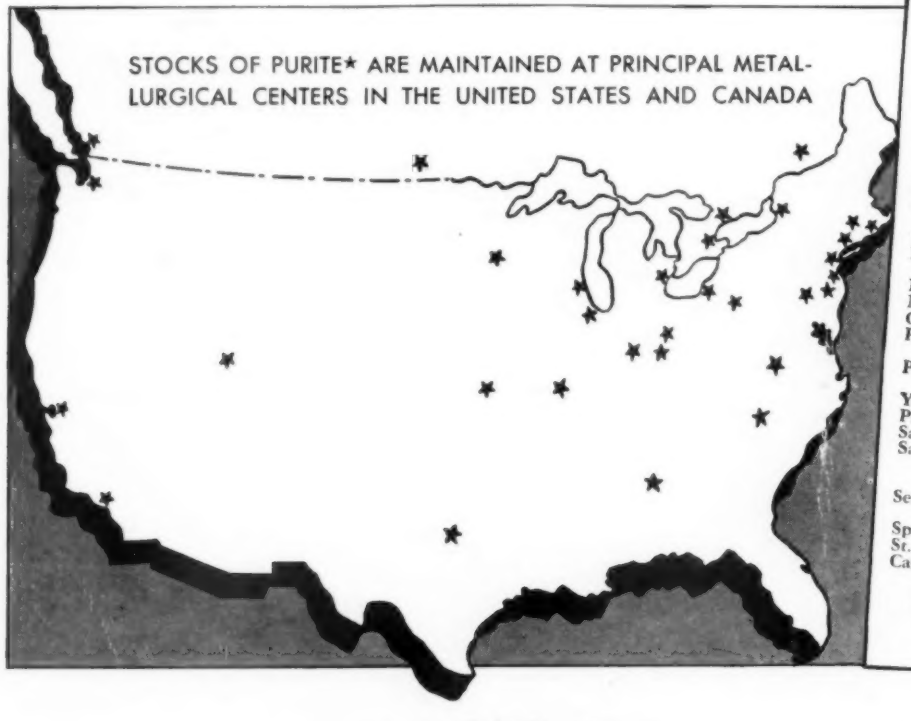
Top: Downdraft Bench with grinders. Middle: Multi-Wash Downdraft Bench. Below: Magnesium pedestal grinder exhaust system.

SCHNEIBLE

THE FOUNDRY INDUSTRY DELIVERS THE GOODS!

TODAY foundrymen are producing high-test castings with all-scrap mixtures which meet the rigors of war in every climate from the South Seas to Siberia. Mathieson takes pride in the part Purite is playing in helping to meet the demand for maximum production of sound, dependable castings. In cupola and mixer ladles in gray iron foundries Purite is reducing rejects and speeding production of high-test castings that machine easily and take a high finish. In converter steel foundries Purite is reducing sulfur from over .10% to under .03% in making castings which withstand the strains of war at 80° below zero. In secondary metal refining and in brass melting, Purite is increasing by several per cent the yield of sound ingots and castings.

PURITE — Soda ash in its most efficient form for metallurgical use



PURITE DISTRIBUTION POINTS

Birmingham—Hill & Griffith Co.
Buffalo—Combined Supply & Equip. Co.
Frederic B. Stevens, Inc.
Charlotte—The Mathieson Alkali Works (Inc.)
Chicago—Hill & Griffith Co.
S. Obermayer Co.
Cincinnati—Hill & Griffith Co.
Buckeye Products Co., Inc.
S. Obermayer Co.
Cleveland—Smith Facing & Supply Co.
Detroit—Frederic B. Stevens, Inc.
Dayton—The Fenton Foundry Supply Co.
Fort Worth—Well Machinery & Supply Co. Inc.
Indianapolis—Hoosier Supply Co.
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Los Angeles—Snyder Foundry Supply Co.
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S. Obermayer Co.
Minneapolis—E. R. Frost Company
Newark—Obermayer, Newark, Div. Springfield Facing Co.
New Haven—Frederic B. Stevens, Inc.
New York—Phillips Isham
Oakland—Pacific Graphite Works
Philadelphia—George F. Pettinos, Inc.
Penn. Foundry & Supply Co.
Pittsburgh—J. S. McCormick Co.
S. Obermayer Co.
York, Pa.—North Metal & Chemical Co.
Providence—Sunlight Chemical Co.
Salt Lake City—Utah Foundry Supply Co.
Saltville, Va.—Mathieson's southeastern states plant where Purite is manufactured.
Seattle—Carl F. Miller Co.
Western Foundry Sand Co.
Springfield, Mass—Springfield Facing Co.
St. Louis—M. A. Bell Company
Canada—Railway & Power Engineering Corp. Ltd.
Hamilton, Montreal, Toronto, Vancouver, Winnipeg

PURITE

THE MATHIESON ALKALI WORKS (INC.)

60 EAST 42ND STREET, NEW YORK, N. Y.

(Licensee of Metallurgical Development Company, Inc.)

New Motion Pictures for Users of Steel

AVAILABLE WITHOUT CHARGE FOR GOVERNMENT USE, AIRPLANE PLANTS, TANK FACTORIES, TRAINING CLASSES AND ALL MAKERS OF COMBAT MATERIALS

Bethlehem Steel Company has just completed two motion pictures designed to assist metallurgists, producers and learners in plants making war materials.

The films have been planned, photographed, and edited under the supervision of leading technical men of the company.

The purpose of the films is to facilitate the efficient handling of steel in its conversion to war-time products.

The films, while simplified as much as possible for the comprehension of the learner, are not designed primarily for entertainment or popular educational value. Hence response to requests from general groups such as luncheon clubs and similar bodies, must be deferred pending our meeting requests from war plants and training schools.

WHAT THE PICTURES SHOW

The pictures are on 16 mm. film, with sound-track, each running for about 40 minutes. The subject matter includes the following:

STEEL FOR THE ARMED FORCES
PART 1
HOW STEEL IS MADE

Blast furnace, bessemer furnace and open-hearth operations.

Animated drawings of what takes place in the blast furnace and open-hearth.

Control of slag in the open-hearth.

Spectrographic analysis.

Still cross-sections of bessemer furnace, electric furnace, and cupola furnace in the foundry.

Standard rolling operations.

Hammer forges and press forges.

Iron and steel foundry.

STEEL FOR THE ARMED FORCES
PART 2
STEEL TREATING AND TESTING

Wire drawing.

Special testing procedures.

Close-ups of inspectors at work.

Preparation of steel for re-rolling.

Animated time-temperature charts showing heat treating sequences.

Standard spark testing procedure.

Stop motion photographs of sparks held at the characteristic point to indicate presence of various alloys.

PROMPT REQUESTS SOLICITED

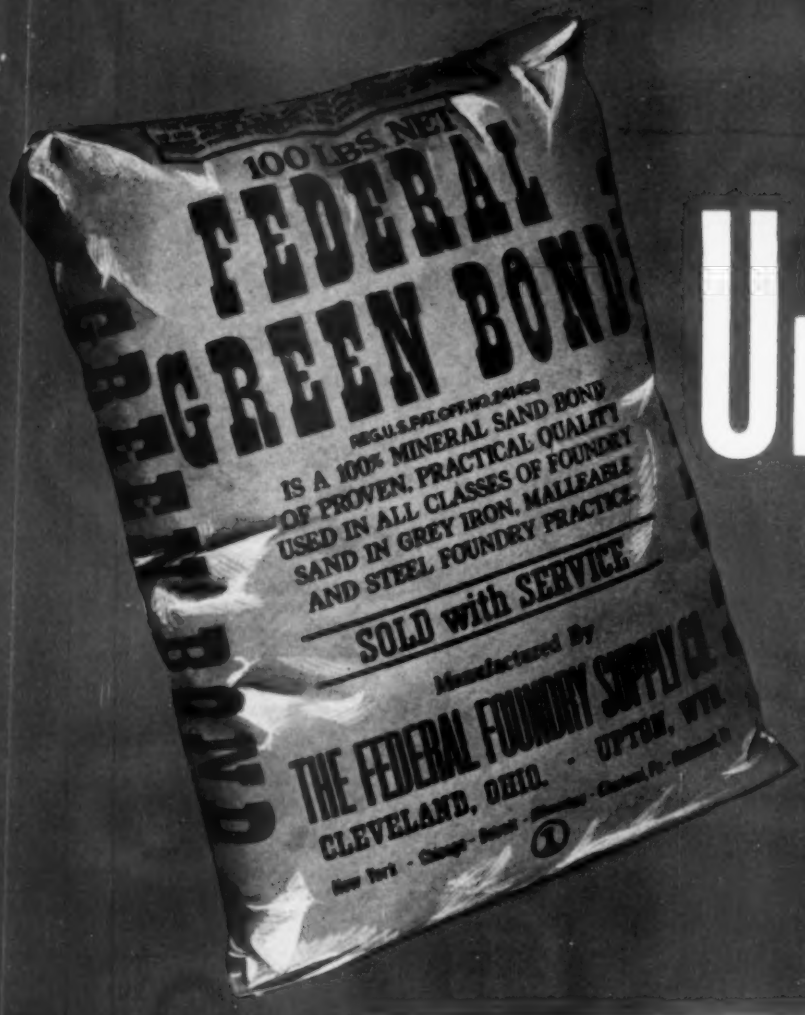
We shall make as many prints as necessary to supply promptly the requests from war producing and training groups. To lower our costs, any such groups are asked to apply for showings promptly so that we may estimate the number of prints which may be needed.

We also have a film library of special-product pictures such as the making of wire rope. Typical groups before which Bethlehem films have been shown in the past year:

Vought-Sikorsky Aircraft Corporation
Union Carbide and Carbon Company
Fleet Service Schools, Norfolk, Va.
San Antonio Air Depot
Springfield Armory
Watervliet Arsenal
Princeton University
Henry Ford Trade School
Purdue University
Inspectors School of Naval Material
Pennsylvania State College
University of Pennsylvania
General Motors Institute
Rensselaer Polytechnic Institute
Frankford Arsenal
Cleveland Ordnance District
University of British Columbia
Virginia Military Institute
Springfield, Ohio, Foremen's Club
Foster Wheeler Corporation
Sun Oil Company

BETHLEHEM STEEL

HOW TO ORDER—*If you represent a war material plant or training group kindly write stating position, name of group, dates you desire the films and optional dates. State length of time you desire to hold prints. There are no charges except return expressage. Address Motion Picture Office, Room 841, Bethlehem Steel Company, Bethlehem, Pa.*



Uniformity

THAT PAYS YOU!

UNIFORMITY OF MATERIAL—Pays you by eliminating the need to check your bentonite-sand mix, once you have established it. Constant control from mine to bag means that Federal Green Bond is uniform from bag to bag or car to car.

UNIFORMITY OF GRIND—Pays you by the rapidity with which it blends evenly with your sand. With today's high speed production you need a bentonite that is ground to mix in the least possible time. Air separation of every particle of Green Bond assures its uniform fineness.

UNIFORM WEIGHTS—Automatic valve packing reduces weight variations from bag to bag to an absolute minimum. You'll never have trouble with batch-to-bag mixes when you use "The Best of the Wyoming Bentonites."

FEDERAL GREEN BOND...

Best of the Bentonites

THE FEDERAL FOUNDRY SUPPLY COMPAN

4620 East 71st Street - Cleveland, Ohio

CHATTANOOGA, TENN. DETROIT ST. MILWAUKEE NEW YORK ST. LOUIS RICHMOND, VA.

THE FOUNDRY

for APRIL 1943

VOLUME 71 NUMBER 4

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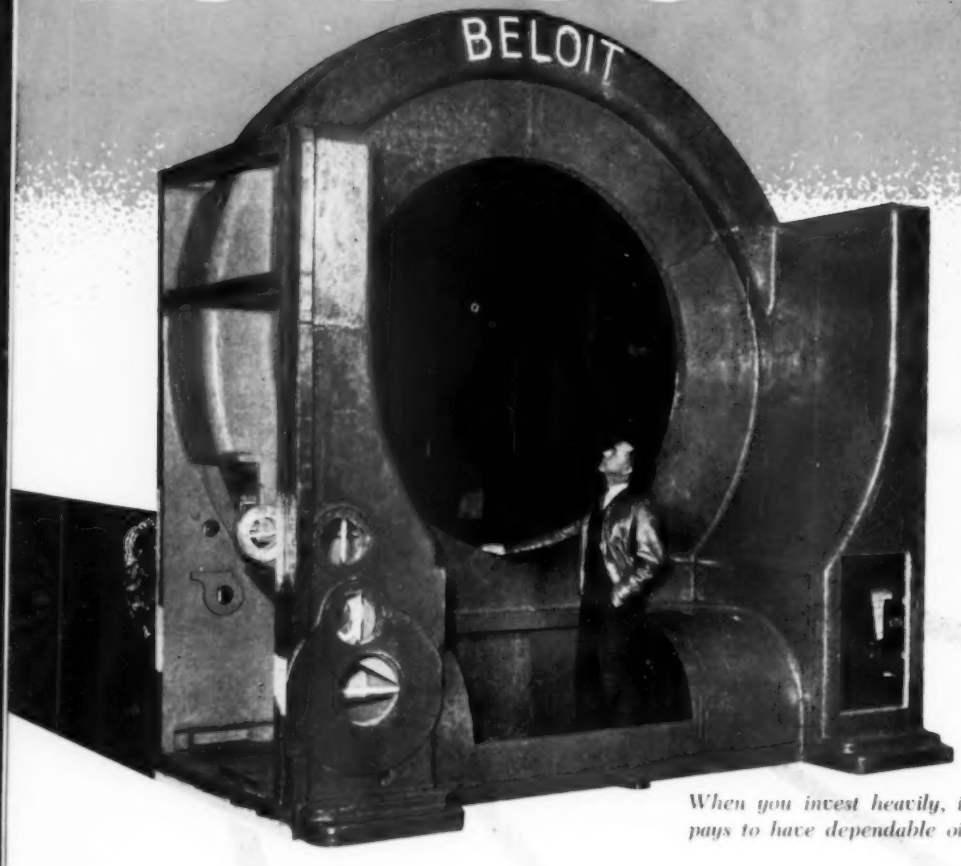
20 tons of Core Sand



When you invest heavily, it pays to have dependable oil

BELOIT IRON WORKS

BELOIT, WISCONSIN

B. L. Baptist
Foundry Superintendent
and

Lathe Housing Casting Weighing

16 TONS

CLEANED

(Outer ring for crank press on turning lathe.)

THERE is only one question to ask yourself today about switching to Linoil: "Can I produce more or better castings by using Linoil?" This is no time for opinions—we urge *you* to find out facts. We do not know the answer for you. But the answer of many—many excellent high grade foundrymen—for themselves is "YES!" So long as there is a possibility that you can give the boys more or better fighting goods by switching to Linoil, you should investigate. Send for the Linoil man and tell him to show you. Or, order a drum of Linoil and compare results carefully for yourself. Every minute, every casting counts. Now is the accepted time. Write, telegraph, telephone.

THE WERNER G&S

(DIVISION OF ARCHER DA

2191 WEST 110 STREET WOODBINE 6 9

o make One Casting

here are 108 oil nd cores in this sembly, weighing ,000 to 41,000 unds.

All cores used in this job are straight oil cores, none of them containing pitch or other oil substitute. The casting is gated in such a way that the metal drops from a height of six feet upon an oil sand core in the drag. Mr. Baptist says that dropping the metal from this height does not cause core to show excessive burning in. This casting is a demonstration of the rightness of using all oil sand on big work. The Beloit Iron Works has been a customer for 10 years and this fact is proof of the rightness of Linoil.

LINOIL

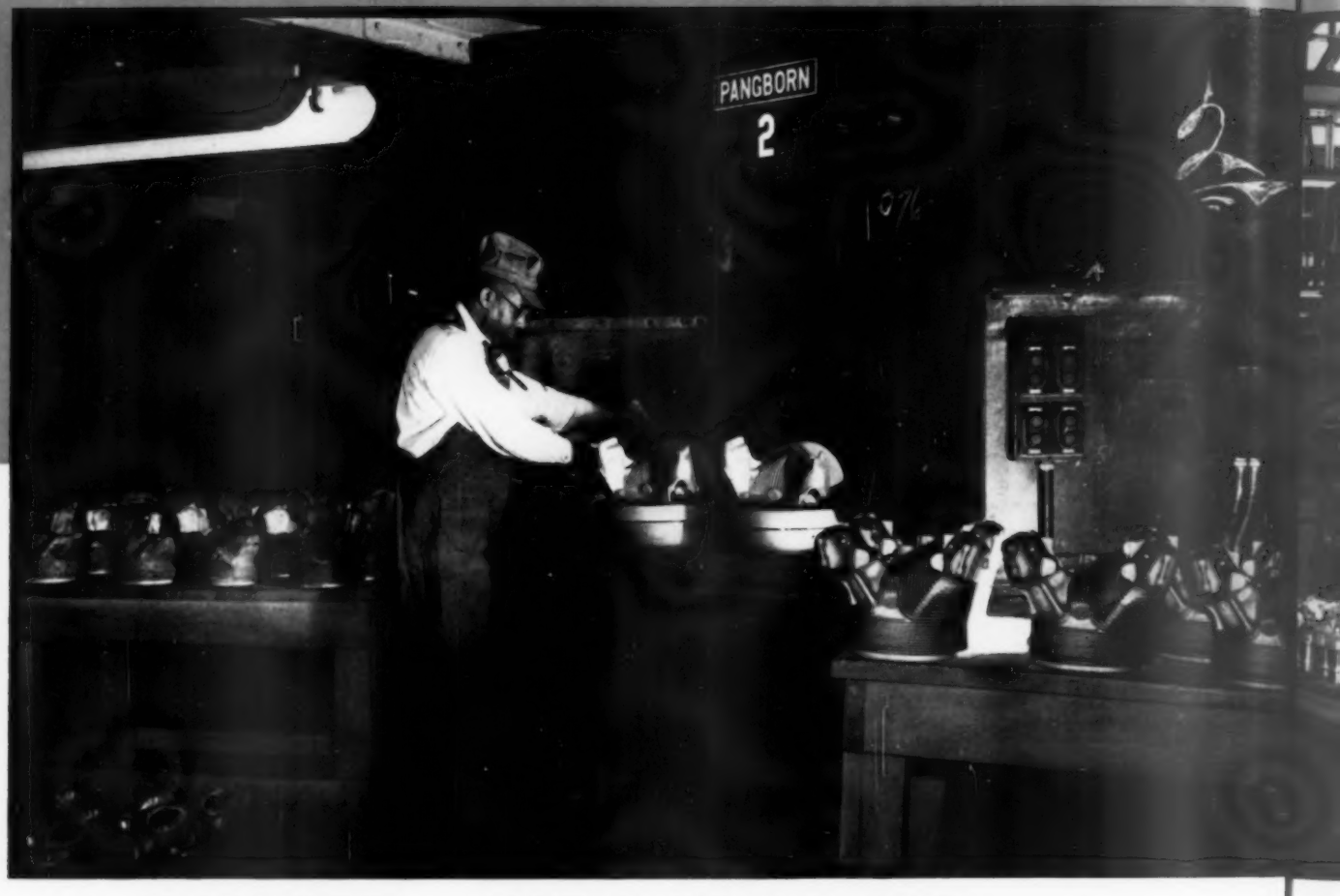
The better you know Linoil, the better you like Linoil

SMITH COMPANY

ANIELS - MIDLAND COMPANY)

690 CLEVELAND, OHIO

ROUGH CLEANING



1 AFTER SHAKEOUT

2 AFTER HEAT-TREAT

TRADE journals have been featuring write-ups on the deep finned cast aluminum alloy cylinder heads for airplanes. Directives have ordered double the original tremendous production of bombers, pursuit, transport and other airplanes for immediate battle requirements. The needed number of cylinder head castings jumped to astronomical figures.

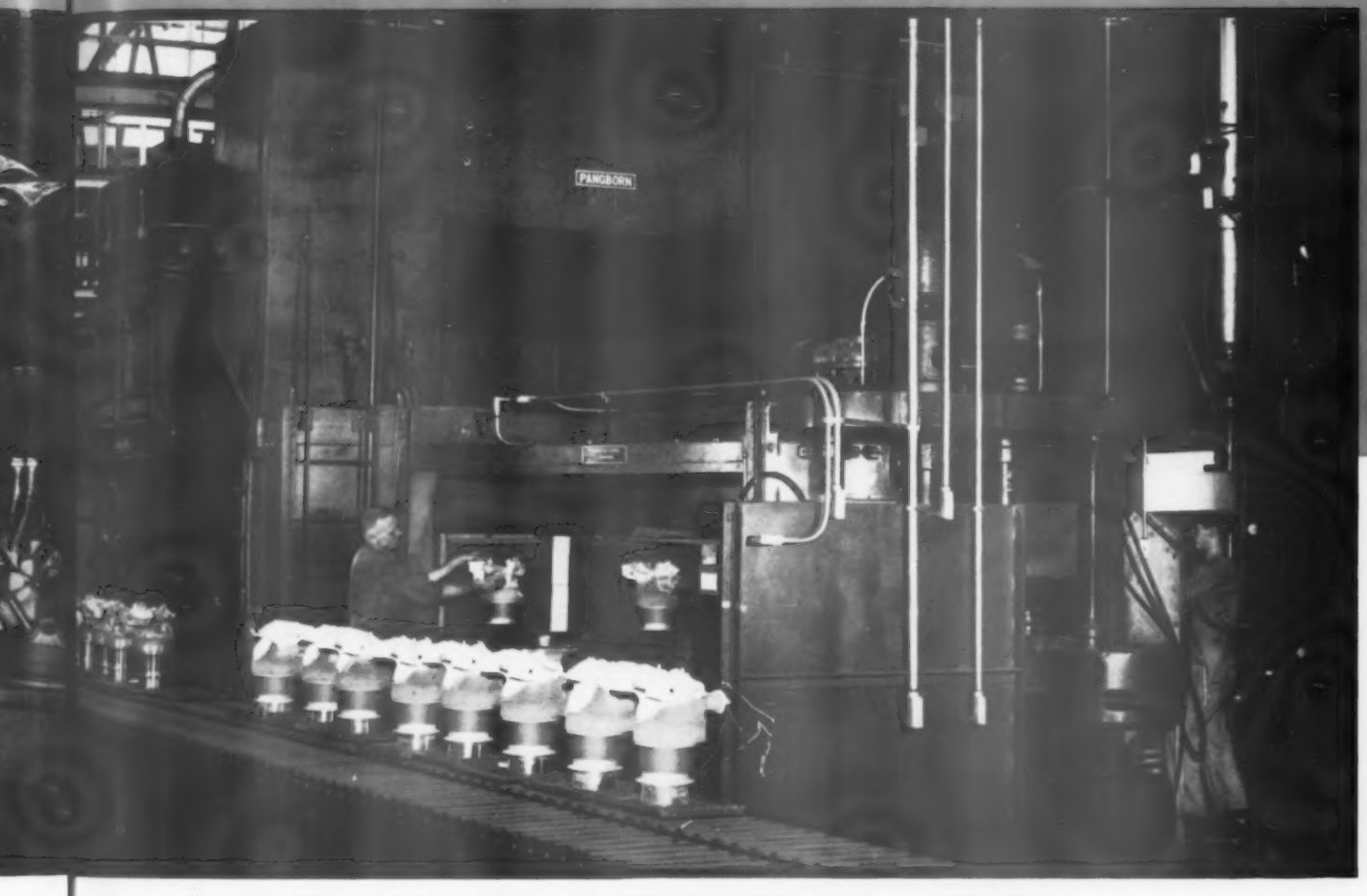
Pangborn broke the impending bottleneck to this almost possible production schedule by designing—*and delivering* eight ROTOBLAST Airless Tables and twelve special se automatic Air Blast Machines for handling this great volume cleaning. And more are now being built.

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

PANGBORN CORPORATION ★ ★

FINISH CLEANING



3 PREPARATORY TO METALLIZING

The ROTOBLAST Tables are used for the first two cleaning operations. As they come from the shakeout the inside and outside surfaces of the castings are table cleaned to remove all sand. The castings are again ROTOBLASTED after heat-treating to remove scale.

The final blast cleaning is done in special Pangborn Air Blast Machines. This treatment removes all grinding marks—and prepares a perfect surface for exterior metallizing.

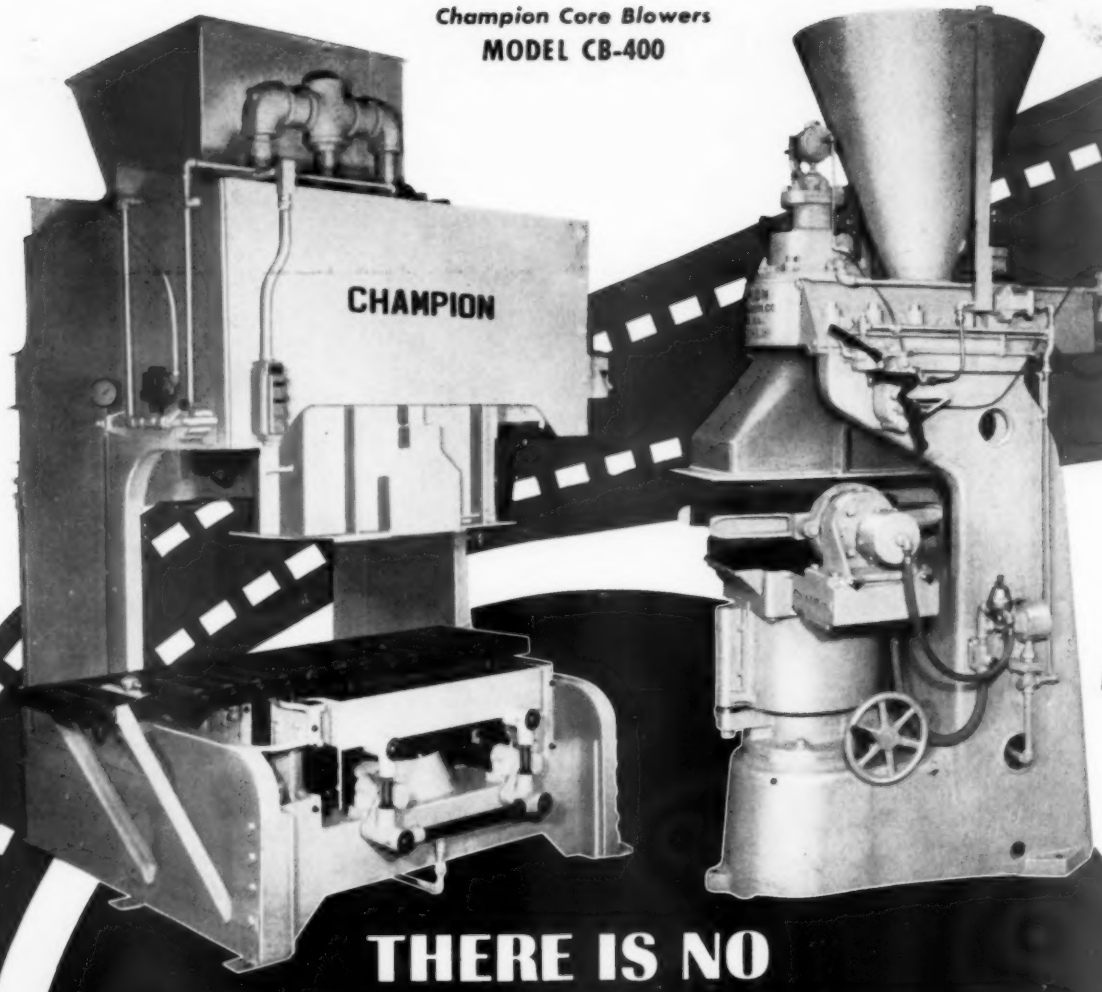
This is a typical example of Pangborn development in Blast Cleaning. Research and engineering like this is helping to create new War Production records. We shall be glad to help you with your problems, too.

CLEANING AND DUST CONTROL EQUIPMENT

BORN

★ ★ ★ HAGERSTOWN, MARYLAND

Champion Core Blowers
MODEL CB-400



Champion
Core Blowe
MODEL CB-

THERE IS NO COMPROMISE WITH A Champion

Every Champion Core Blower Is Designed and Constructed to Stand on Its Own Feet!

When the body blows of All-Out War Production came to the foundry, *Champion* Core Blowers were able to stand the gaff. Designed and built to Championship specifications, oversized parts where the wear is greatest, these modern machines have proved their Championship calibre.

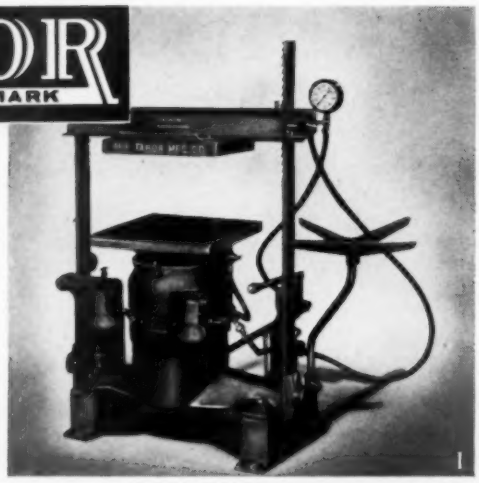
Any man, woman or child can economically produce perfectly rammed cores with a Champion Core Blower. The operator need only set the box, pull the lever and he can make uniformly accurate cores.

It's smarter today than ever before to string along with a Champion.

CHAMPION
FOUNDRY & MACHINE CO.

1318 West 21st Street, Chicago

TABOR
TRADE 1834 MARK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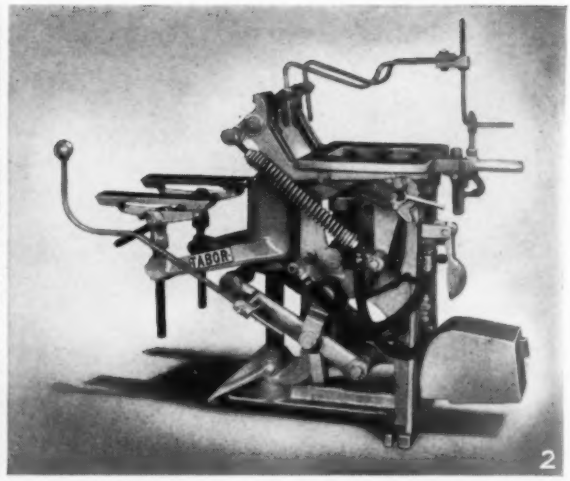
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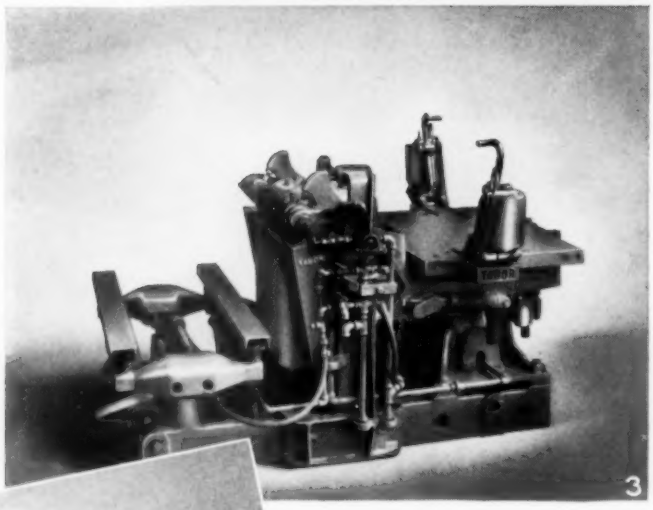
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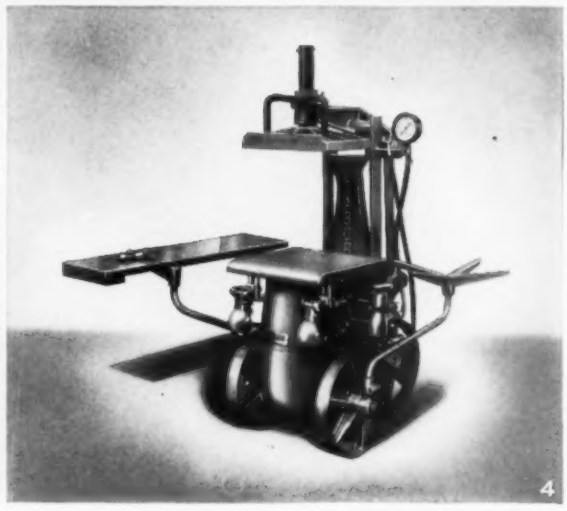
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5

6

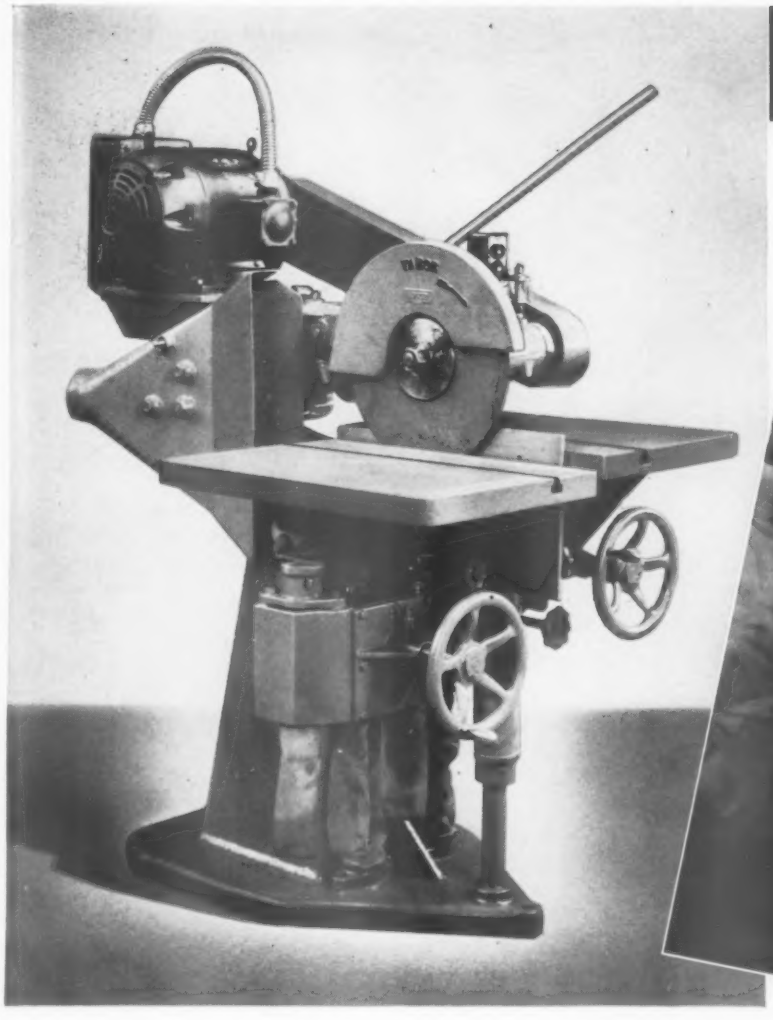
TABOR FOUNDRY MOLDING MACHINES

1. **JAR SQUEEZER—Yoke Type**
2. **JAR-RAM HAND ROLLOVER HAND DRAW MACHINE**
3. **JAR POWER ROLLOVER POWER PATTERN DRAW MACHINE—with air operated flask clamps.**
4. **JAR SQUEEZER—Cantilever Type**
5. **JAR SQUEEZE FLASK-LIFT MACHINE—Pintle Post Type.**
6. **PORTABLE JAR SQUEEZE FLASK-LIFT MACHINE—with adjustable lifting pins.**

The several types shown here are representative of the complete line of Tabor Foundry Molding Machines. Tabor can supply the right type of machine for any molding need . . . to gray iron, steel and non-ferrous foundries of any size. We have been designing, building and adding to the line for over half a century. So, whatever your molding machine problems, call on Tabor.

THE TABOR MANUFACTURING COMPANY
6225 Tacony Street • Philadelphia • Pennsylvania

Representatives: Snyder Foundry Supply Co., *Los Angeles, Calif.;* Pacific Graphite Works, *Oakland, Calif.;* Carl F. Miller & Co., *Seattle, Wash.*



TABOR
TRADE 1884 MARK

TABOR-BRASIVE CUT-OFF MACHINES

Users say . . .

". . . We highly recommend the Cut-Off Machine which we purchased from you a few months ago. It is a real saving in time, money and labor. Before we purchased this machine, we used saws and this process was long. The machine saves us both time and labor as it cuts the castings much quicker and better. We have also eliminated the heavy expense of the band saws and we find that the expense connected with the machine is far less than the amount of the saws used . . ."

And

". . . advising you again how pleased we are with the machine. It has been running steadily since we received it in June (two months) without a single break-down of any sort, and it has made hundreds of cuts during this time.

. . . Assuring you that at any future time we may be in need of machines of this nature, we will certainly contact you first, we are, etc."

Tabor-Brasive Cut-Off Machines save time, money and labor in cutting gates and risers from castings of manganese bronze, nickel, Monel and other non-ferrous alloys, as well as alloy steel. Built in a complete line of sizes and types to meet any cutting need.

THE TABOR MANUFACTURING COMPANY
6225 Tacony Street • Philadelphia • Pennsylvania

Representatives: Snyder Foundry Supply Co., *Los Angeles, Calif.;* Pacific Graphite Works, *Oakland, Calif.;* Carl F. Miller & Co., *Seattle, Wash.*

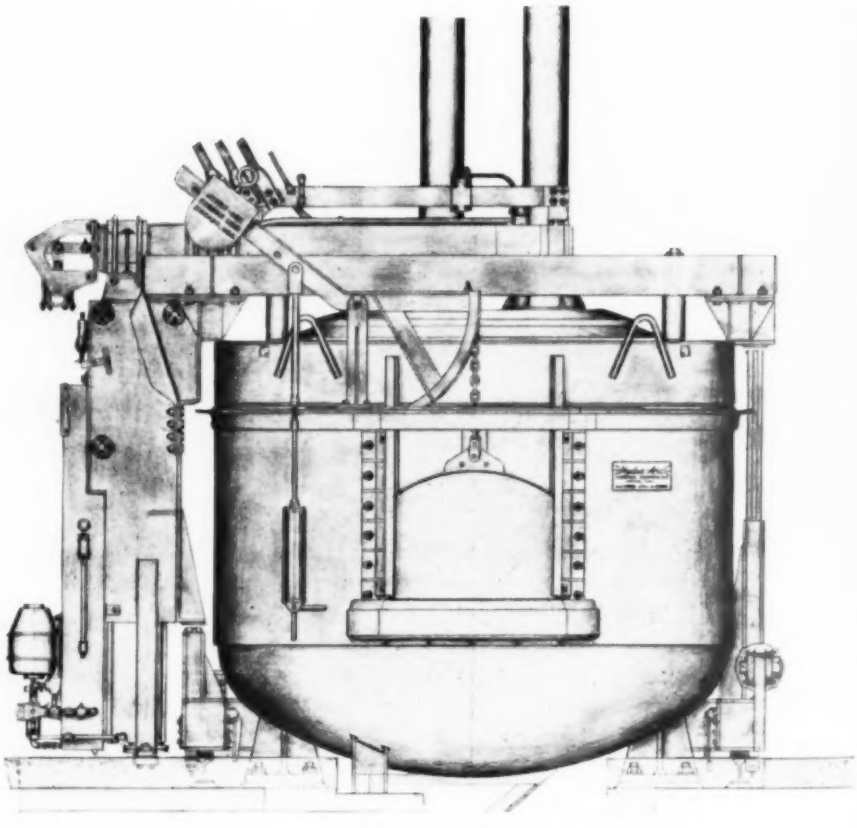
"More Important DEVELOPMENTS THAN ALL OTHERS"

"The Hydro-Arc Furnace Corporation has shown me more outstanding developments in Electric-Arc Melting Furnaces than all other organizations put together in the past twenty years", says the Chief Engineer of one of the largest users of Electric-Arc Melting Furnaces.

Two outstanding features of the Hydro-Arc Furnace are:

(1) HYDRAULICALLY POSITIONED ELECTRODES.
(2) POWER OPERATED ELECTRODE CLAMPS.

The Hydro-Arc Furnace uses low inertia air for counter-balancing to cooperate with a simple, accurate, hydraulic control to operate each electrode. The few moving parts of this combination have no stretchable steel cable nor limit switches to watch. Low upkeep—less surging—less electrode wash and more accurate metal making at lowest costs are being accomplished.



HERE'S WHAT MELTERS SAY:

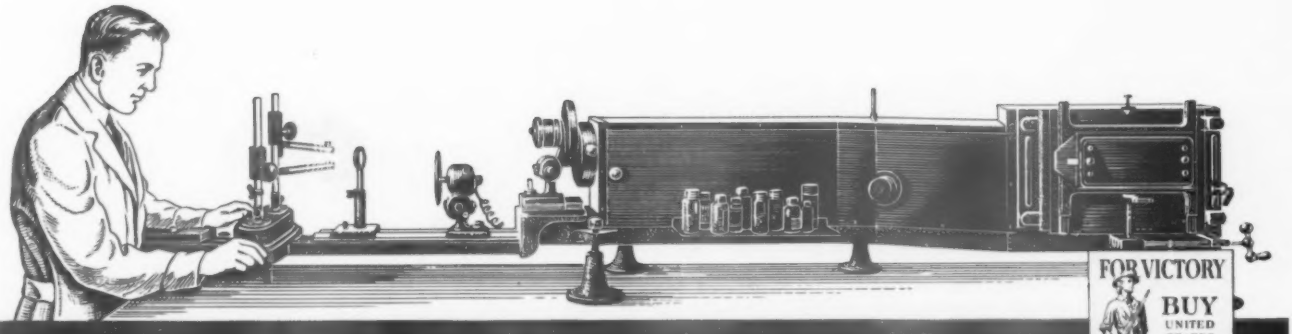
1. "No climbing on the furnace among the flames to strain on burnt bolts and no swinging the sledge hammer to clamp electrodes!" 2. "Electrodes slipped from the floor!" 3. "Look at the hydraulic control!" 4. "No steel cable stretch, none to break!" 5. "Fastest electrodes I ever saw, but good control!" 6. "Simple isn't it? Can change any part in a few minutes!" 7. "Blows dust off of the electrodes as they are slipped." 8. "No troublesome limit switches on the electrode arms." 9. "Larger roof ring diameters—saves burning out flanges."

Hydro-Arc engineers will cheerfully study your Electric Melting Furnace problems and make complimentary suggestions.

HYDRO-ARC FURNACE CORPORATION

561 HILLGROVE AVENUE, LA GRANGE, ILL. *(A suburb of Chicago, Ill., U. S. A.)*
Telephones: La Grange 4545 and 4546 **Chicago Line: Enterprise 1068**

Associated with Whiting Corporation



Sees All-Tells All!

The magic eye of the Spectograph, for which this brilliantly illuminated arc lights the way, literally sees all and tells all about the metals in process of smelting in the various huge batteries of furnaces in Michigan Smelting plants. While the metal is still molten in the furnace, control of the elements in the alloy is now possible. In the most scientific, fastest way, the Spectographic method tells Michigan Smelting technicians of every element and in what quantity, it is present in the sample drawn from the furnace charge. This is only one of the many technical controls developed and used here at Michigan Smelting Division—controls that enable the smelting of non-ferrous alloys to rigid specifications, and of a high quality that never varies.

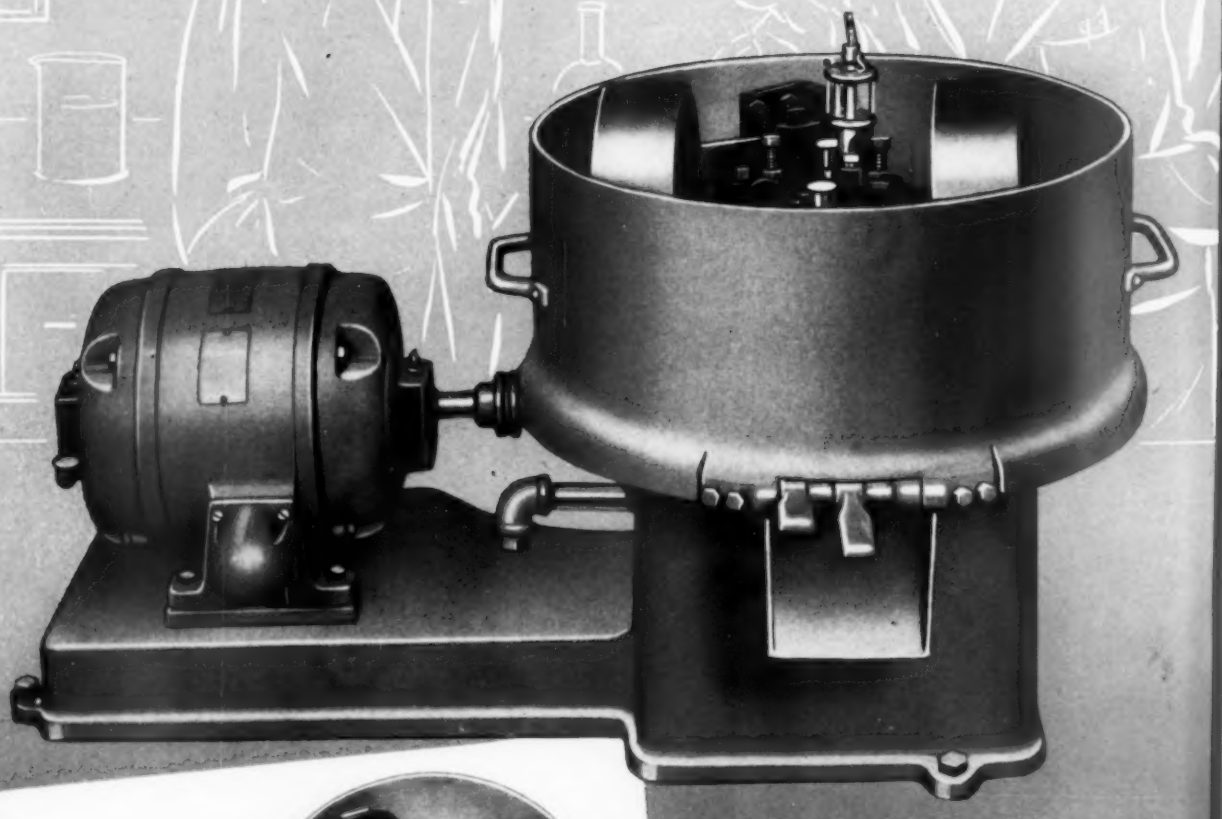
MICHIGAN SMELTING
AND REFINING

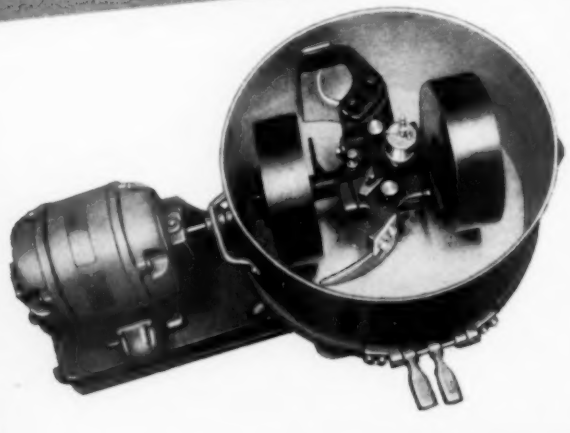
DIVISION OF
BOHN ALUMINUM AND BRASS CORPORATION
DETROIT, MICHIGAN

GENERAL OFFICES • LAFAYETTE BLDG.

NON-FERROUS SCRAP METAL REFINERS FOR 50 YEARS

SIMPSON *Laboratory Size* MIXERS





Built on the same exacting specifications as the larger size Simpson Mixers, the Laboratory mixers are available in both 18" and 24" diameter pan sizes. They have automatic discharge doors and adjustable mullers.

THEY WILL HELP YOU SOLVE NEW DEVELOPMENT AND CONTROL PROBLEMS IN SAND PREPARATION

THE most capable fighting tools ever produced are in the hands of the finest fighting men in the world—they're American tools and American men.

Industrial America is building those implements of war better and faster because it is the American Way of doing things. That's our spirit — to improve and increase — to develop and progress.

In the foundry industry a gigantic task has been, and is being, achieved in meeting the demands for thousands of types of castings . . . better castings . . . more castings . . . faster! New casting requirements often mean new problems that involve new specifications, new materials and techniques. Finding the answers and proving them quickly and simply in the laboratory has helped to maintain production at a peak in many foundries.

In changing sand specifications, for example, Simpson Laboratory Size Mixers have made it possible to work out new developments and set up exacting controls so that sand system production is not sacrificed in the changeover period. Time is saved—labor is saved—costs are reduced — and standards for checking future production are established.

The advantages Simpson Laboratory Mixers can give you are surely important today. But far-sighted management will see in them also, an asset in the peacetime competition after victory.

Ask a National Engineer to talk it over with you.

The A.F.A. meeting, soon to be held in St. Louis, brings foundrymen together to discuss and learn; to exchange ideas and consolidate opinions. In these vital days no investment of time could be more important, for from this meeting much progress will be stimulated. Progress to help achieve victory more quickly and to prepare the groundwork upon which tomorrow's world will be built. The National organization is proud to be part of the foundry industry.

This Service Manual is helping keep National Equipment operating at top efficiency. Containing complete installation, maintenance, operating and lubrication details it is on hand wherever National Products are working. Available to all who can use it — it is a part of National's thorough service.

SIMPSON

INTENSIVE MIXERS

BUILT IN 10 SIZES

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

When you specify SCHRAMM COMPRESSORS

Design in Construction makes these Compressors the "Lightweight Champions" of the World

Without sacrificing an ounce of pressure or a day of hard-hitting useful life Schramm gives you a compressor with a weight saving up to 40%. . . . Take a look at the straight-in-line vertical cylinders, cast en-bloc—a compact arrangement that makes for streamlining and releases critical materials which are so badly needed in our present crisis. So, for any job that requires compressed air—For Pneumatic Tools specify Schramm—the Lightweight Champion that can step out of its class and take on the toughest of them.

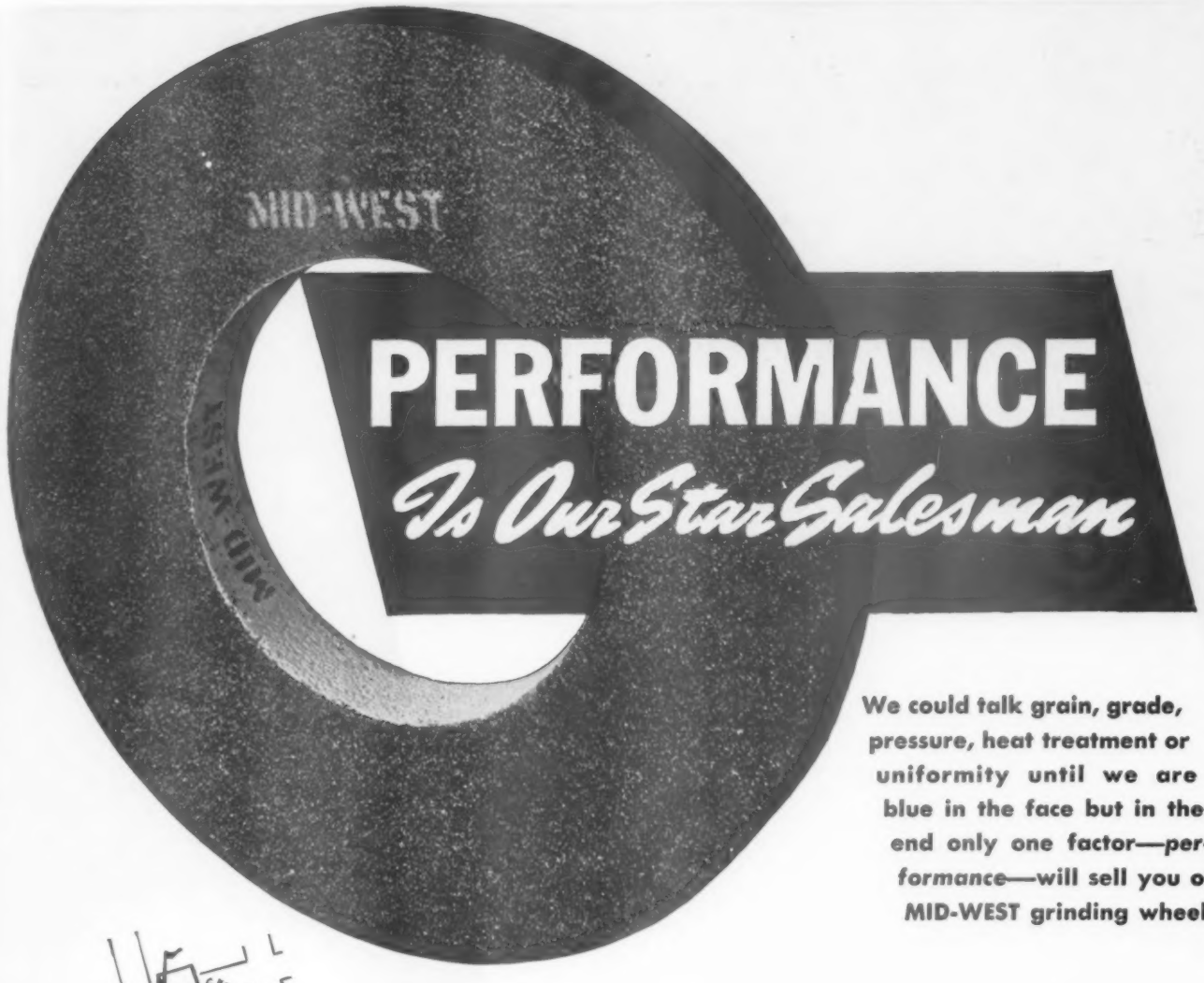
If you want facts and figures on the complete line-up of Schramm Compressors, *Write Today for Our Interesting Catalog—42S—They're FREE.*

SCHRAMM

THE COMPRESSOR PEOPLE

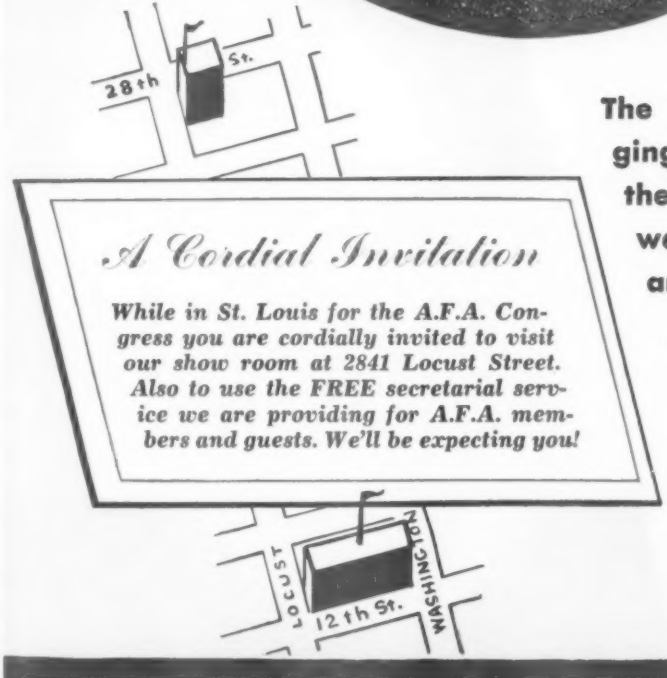
WEST CHESTER, PENNA.

STATIONARY • "V" or FLAT BELT DRIVE • • • "BUILT-IN" MOTOR DRIVE . . . 50 to 600 CU. FT.



PERFORMANCE
Is Our Star Salesman

We could talk grain, grade, pressure, heat treatment or uniformity until we are blue in the face but in the end only one factor—*performance*—will sell you on MID-WEST grinding wheels.


28th
St.
L
A Cordial Invitation
While in St. Louis for the A.F.A. Congress you are cordially invited to visit our show room at 2841 Locust Street. Also to use the FREE secretarial service we are providing for A.F.A. members and guests. We'll be expecting you!
LOCUST
12th St.
WASHINGTON

The performance of MID-WEST snagging wheels in foundries throughout the country is ample proof of any claim we may make for them. Just ask a user and you'll be told:

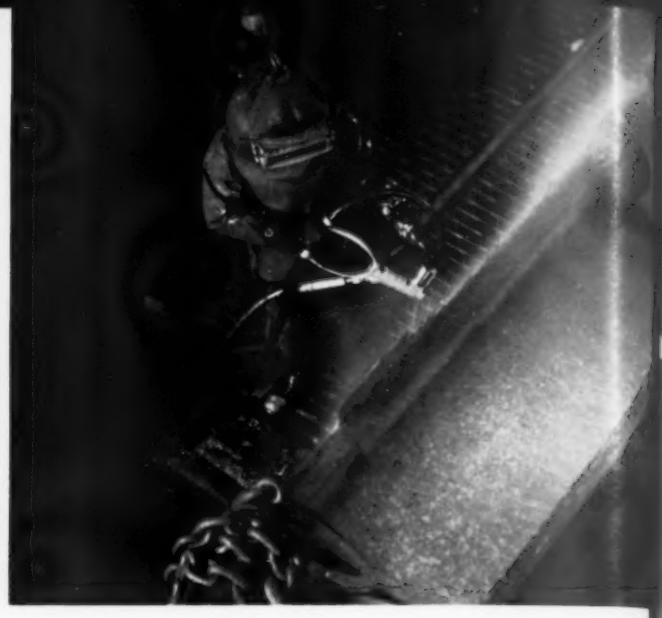
1. THEY'RE FASTER CUTTERS
2. THEY LAST LONGER
3. THEY INCREASE PRODUCTION
4. THEY DECREASE COST

Next time you order grinding wheels order MID-WEST and watch us prove these claims to you.

MID-WEST ABRASIVE COMPANY

Manufacturers of DEPENDABLE Abrasives

1960 E. Milwaukee Avenue — Detroit, Michigan



They said: "Sand and water could not be propelled at a velocity of 3 miles per minute by a single mechanism because the abrasive action of the sand at such terrific velocity would destroy the moving parts of the equipment." *Hydro-Blast engineers accomplished this previously impossible feat by confining abrasive action to the instantly replaceable, low cost nozzle liners.*

2 They said: "Not even the huskiest foundryman can handle a Hydro-Blast gun while it is expelling sand and water at a *velocity* of 3 miles per minute. Even a fire hose at 300 to 400 pounds *pressure* requires 4 to 6 strong men to control it." *Hydro-Blast engineers overcame the problem of back pressure by replacing large volumes of water at terrific pressure with a fine stream of sand and water at high velocity.*

3 They said: "Satisfactory castings cannot be made from reclaimed sand because of the presence of burned particles, fines and other refuse. It is far more economical to dispose of used sand than to attempt to reclaim it." *Hydro-Blast engineers disproved this fallacy by washing, classifying, drying and returning sand to the molding floors in better than new condition at less than 75 cents per ton, including labor, power, water and maintenance.*

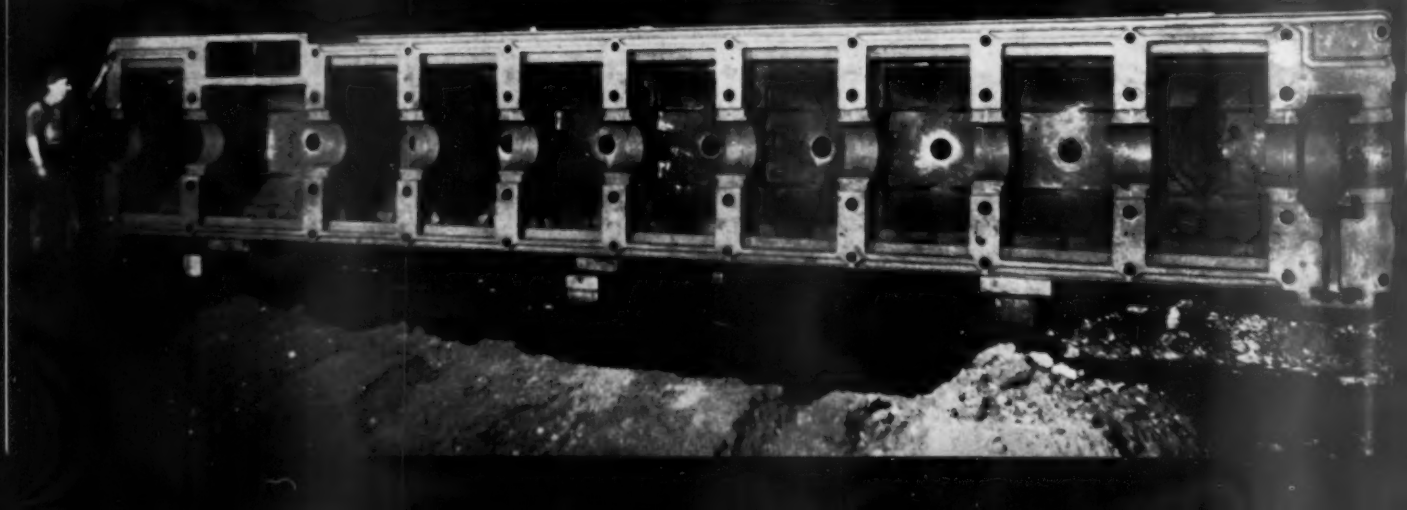
4 They said: "Casting cleaning, especially on large, heavily cored work, has always been a manual operation and two men can never do the work of ten." *Hydro-Blast engineers have proved beyond the shadow of a doubt, and on many installations that two unskilled laborers and a Hydro-Blast can do the back-breaking work required of 10 chippers.*

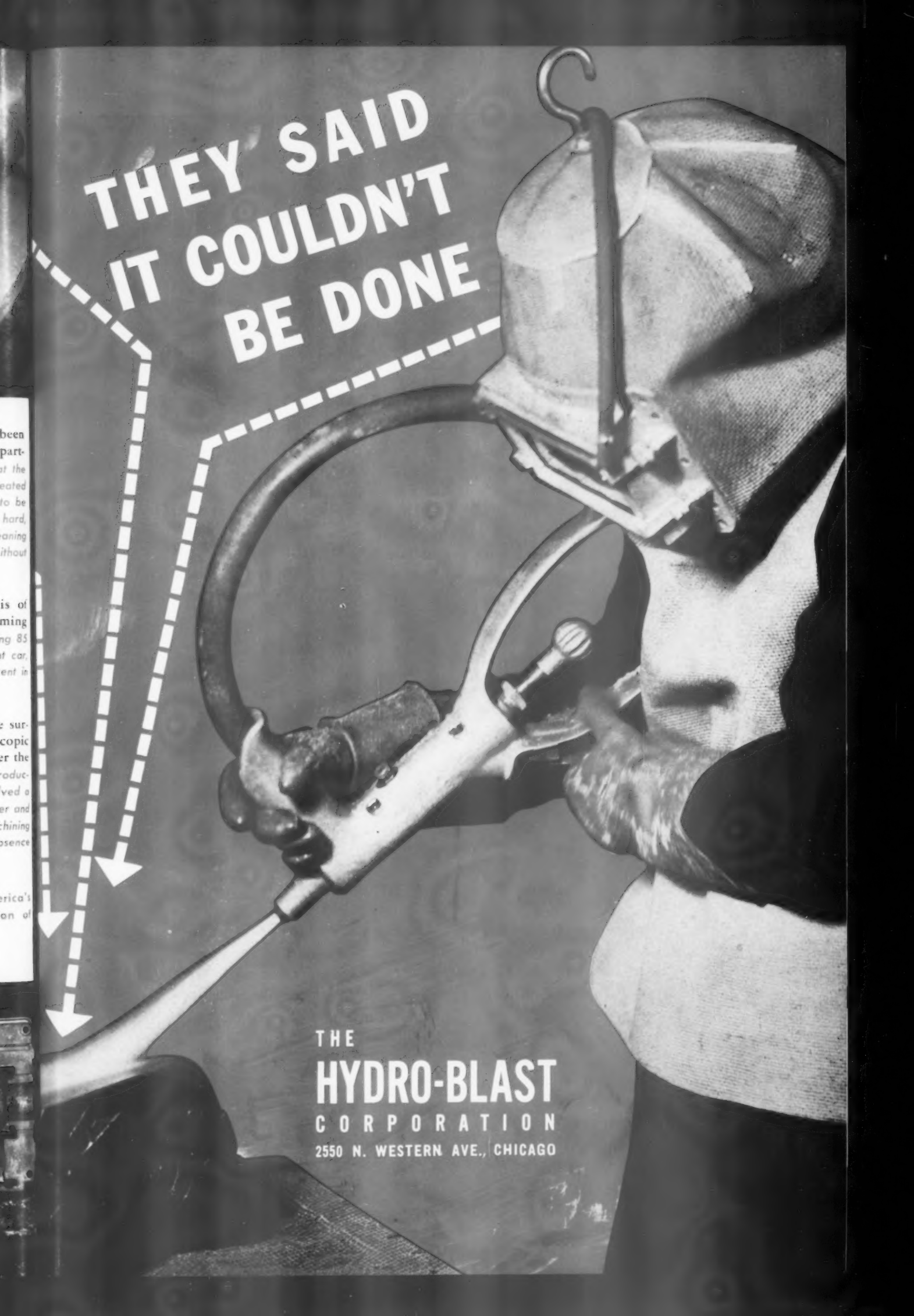
5 They said: "The foundry cleaning room has always been and must always remain a dirty, dusty, unhealthful department." *Hydro-Blast engineers, worked on the theory that the creation of dust was a problem and that if no dust were created no dust need be removed. Hydro-Blast velocity proved to be the answer. Today, many Hydro-Blasts are mining out hard, complex cores, performing sand chipping operations, cleaning surfaces surgically clean, and recovering waste sand without creating dust.*

6 They said: "The transportation of foundry sand is of necessity an unavoidable, expensive and time-consuming foundry operation." *Hydro-Blast engineers, by recovering 85 percent of the sand input by weight, are reducing freight car, barge and dump truck requirements better than 75 percent in Hydro-Blast equipped foundries.*

7 They said: "No method of cleaning would produce surfaces surgically clean to the point where microscopic abrasive dust and scale could not be seen under the binocular microscope." *Hydro-Blast engineers, by introducing waste sand into the high velocity water stream evolved a scrubbing effect that not only decores castings faster, better and cheaper but surface cleans the castings so that less machining is required and machine tools last longer because of absence of imbedded sand particles.*

Hydro-Blast engineers will gladly work with America's war-important foundry industry toward the solution of casting cleaning problems.




THEY SAID
IT COULDN'T
BE DONE
THE
HYDRO-BLAST
CORPORATION
2550 N. WESTERN AVE., CHICAGO

GRIMES
MOLDING MACHINES

Hand and power roll-overs for core room and foundry

The machine illustrated above is the Model C-414, in pattern drawn position. Capacity of flasks 36 x 46. This is the machine being widely used for the greatly accelerated magnesium castings production.

We are prepared to study your production problems and manufacture to your particular molding machine requirements.

Through our sales-engineering division, we are also ready at any time to consult with you on the correct installation of complete core sand mixing units, incorporating automatic proportioning of ingredients, engineered to any mixing problem you may have.

Wire, phone or write us for complete information.

GRIMES MOLDING MACHINE CO.
1429 VIRGINIA PARK DETROIT, MICHIGAN

MACKLIN GRINDING WHEELS

MADE in all sizes and shapes there is a Macklin Grinding Wheel for every type of grinding job that will show cost-saving results and *"Protect Your Production."* An experienced Macklin Field Engineer is available at all times for the asking—*no obligation.*

DON'T TAKE BONDAGE..
INVEST IN WAR BONDS

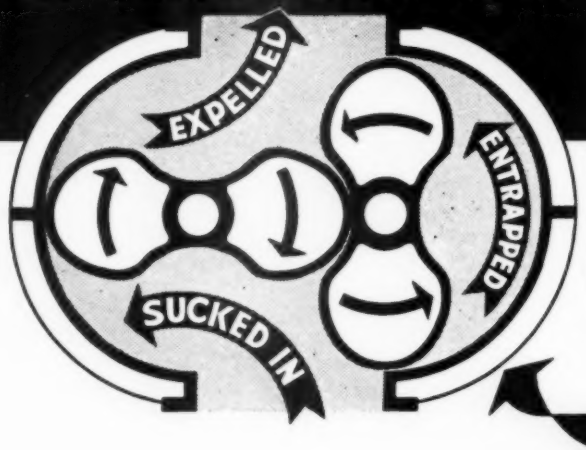
MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

ROOTS POSITIVE DISPLACEMENT PRINCIPLE OF AIR MOVEMENT



Roots positive displacement principle is simple, consisting of a pair of scientifically designed, identical impellers mounted on parallel shafts and enclosed in a metal housing. The impellers are connected by a pair of gears and rotate in opposite directions. As the tip of one impeller sweeps past the blower inlet, entrapping a definitely measured volume of air, the other impeller is expelling a like volume. Each revolution positively discharges four measured volumes of entrapped air.

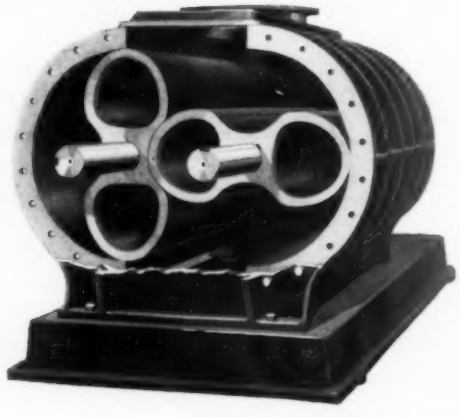
Definitely Measured VOLUME OF AIR

The displacement per revolution is fixed, with speed selected to give exact capacity wanted. Pressure developed is only that needed to overcome the resistance to flow of air through the cupola.

"R-C" blowers operate at high efficiency at all pressures up to the maximum for which they are designed mechanically, making them particularly well adapted for foundry cupola applications where the blast pressure is not constant during a heat or uniform for all heats, as the blast pressure may vary from time to time due to the coke used, method of charging, melting rate, resistance created by flow measuring devices, etc.

Roots-Connersville positive displacement blowers will build up the pressure needed to keep air flowing through the tuyeres, even though this pressure may be considerably higher than normally required and greater than the blower was installed for.

Drive from motor through V-belt permits easy change of blower speed to meet variation in melting requirements.



HIGH VOLUMETRIC EFFICIENCY

Note the large inlet and discharge openings without valves or restriction of the blower. As air velocity through the blower is no greater than in the pipe leading to the blower, loss from wire drawing and surface friction is negligible.

A pair of gears, running in oil, maintains the accurately gauged clearances between impellers measured in thousandths of an inch. Loss due to slippage is thus held to a minimum. The "know how" which enables economical production to such close clearance without internal contact is a direct result of Roots-Connersville's unequalled experience of more than 85 years.

"R-C" Positive Displacement Blowers are built in a wide range of sizes up to 50,000 CFM, and for pressures up to 15 lbs. gauge in single stage and 30 lbs. in two-stage compound arrangement.

ROOTS-CONNERSVILLE BLOWER CORP.
304 Madison Ave. **Connersville, Ind.**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

PLAN NOW—TO SAVE TIME, LATER

Even though priorities may delay your procurement of new equipment, we shall be glad to help you work out the details of your blower needs now—for future fulfillment. Write for Bulletin 22-23-B11.

Roots CONNERSVILLE SINCE 1854 *Rotary Positive* **BLOWERS**

STROMAN

MAGNESIUM MELTING & HOLDING FURNACES

To get increased production . . . faster melting . . . speedier handling . . . alloys of uniform analysis . . . minimum spilling waste . . . continuous trouble-free operation . . . longest life . . . utmost fuel economy . . . use STROMAN CRUCIBLE MELTING FURNACES.

Incorporating many new and exclusive features including the famous STROMAN STATIONARY LIP POUR which eliminates ladle shifting during the pouring operation, these furnaces are indeed the foundryman's answer . . . solving the question of ever increasing all out war production.

COMPLETE AUTOMATIC TILTING is entirely controlled, simply, safely, and correctly by the mere touch of a fingertip. Correct temperatures are attained quickly and maintained indefinitely. Available with either oil or gas fire. Capacities: 350 to 2000 pounds of magnesium or equivalent weights in aluminum.

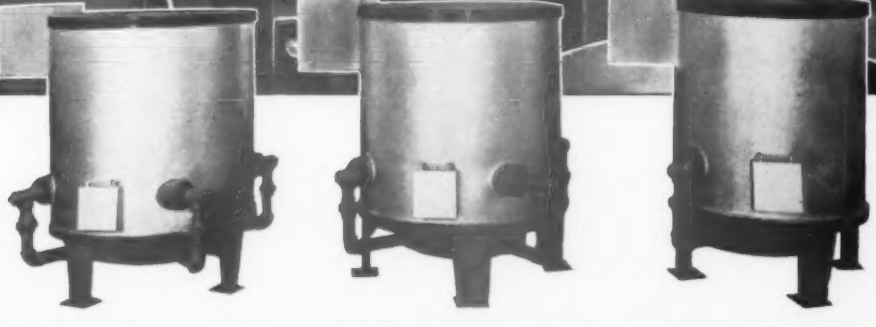
THE COMPLETE STROMAN LINE

includes the most advanced furnaces for melting Brass, Bronze, Magnesium, Aluminum, and all other types of non-ferrous metals.

Your inquiries are solicited.

STROMAN STATIONARY HOLDING UNITS

for magnesium are built in sizes from 90 to 550 lbs. Oil or Gas fired.



Cap. 550 lbs. magnesium | Cap. 350 lbs. magnesium | Cap. 200 lbs. magnesium

STROMAN FURNACE & ENGINEERING CO.

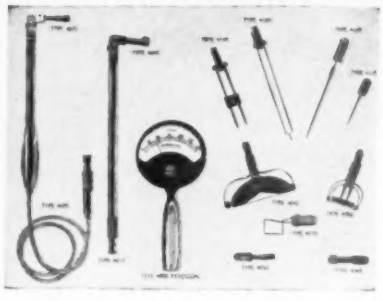
DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO

Specialists—IN TEMPERATURE MEASURING INSTRUMENTS FOR ALL FOUNDRY PURPOSES

SURFACE TEMPERATURE

The Alnor Pyrocon for surface temperatures appeals particularly to the welder and to operating men who must have extremly accurate direct readings of temperatures of any surface . . . flat or curved, stationary or revolving . . . in a few seconds. Ten types of thermocouples . . . two types of arms . . . all instantly interchangeable without adjustment assures adaptability to scores of uses in the shop, laboratory or production line.



FOUNDRY

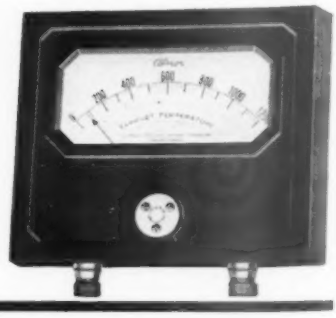
The Alnor Pyro-Lance for Non-Ferrous Metal Temperatures is a rugged, durable pyrometer for hard use on the pouring floor or in the furnace room of the foundry. It is a completely self-contained portable instrument that will help you lower costs by reducing scrap losses, cut your fuel consumption, improve your castings and speed up production.

CONTROL

The Alnor Electronic Pyrometer Controller provides close temperature control without motors, depressor bars, or other moving mechanical parts. Operating on the electronic principle, the indicating pointer is free at all times to give continuous and accurate temperature readings.

HEAT TREATING

The Alnor Rectangular Pyrometer, an indicating pyrometer with a long scale of high accuracy, is ideal for use with heat treating furnaces, ovens, soft metal pots, and other operations where permanent accuracy, rugged construction and close readings are essential.



ILLINOIS TESTING LABORATORIES, Inc.

418 No. La Salle Street **Chicago, Illinois**

KORGLAZE

A NEW PRODUCT FOR PROCESSING CORES TO A FINE, SMOOTH FINISH

KORGLAZEKORGLAZEKORGLAZEKORGLAZE

Results obtained through the use of KORGLAZE are astonishing. Compared with other cores, in the matter of fine, smooth finish, KORGLAZED cores suggest a lily against a hunk of coke.

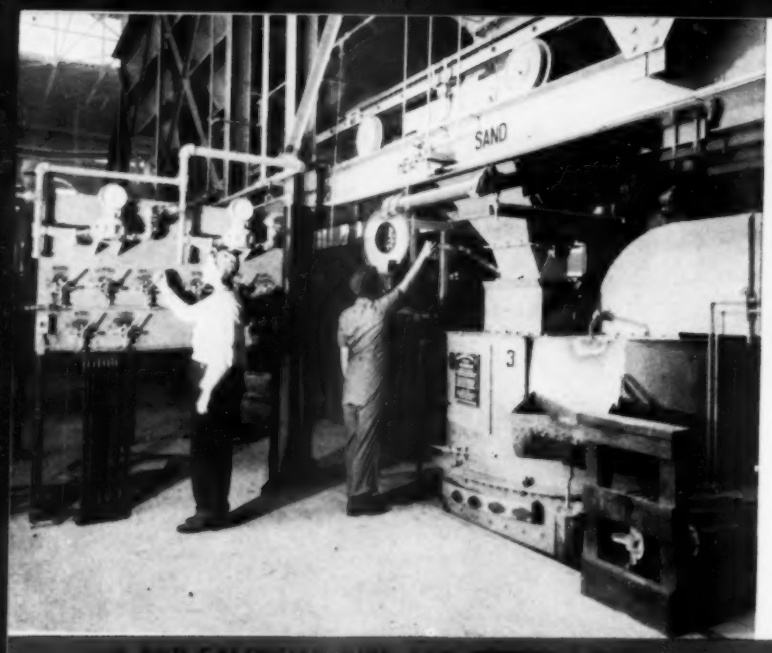
UNITED OIL MFG. CO.
1429 WALNUT ST.
ERIE, PA.

KORGLAZEKORGLAZEK

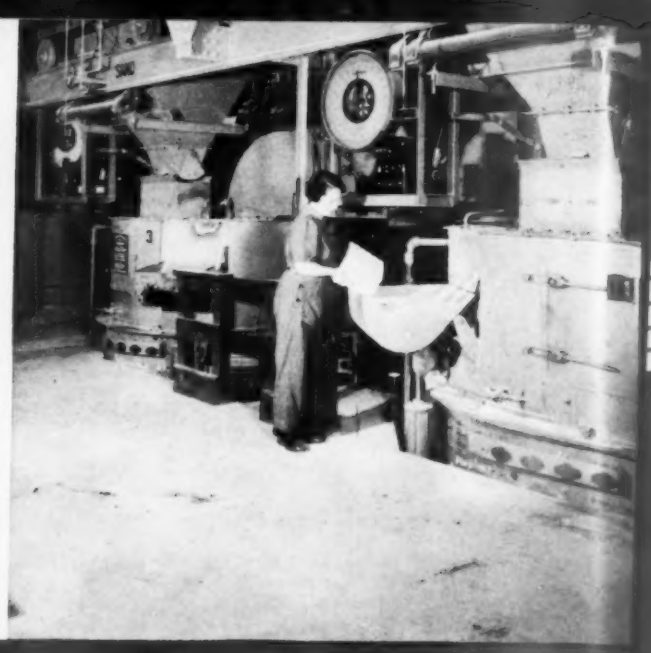
• The most practical method to reduce machining costs, thereby saving time and metal, is to make castings to true dimensions. KORGLAZE effects an actual saving of metal by keeping the inner surface of the castings smooth and permitting castings to be poured to a more exact size. After the jobs are shaken out, the cores pour out like sand from an hour glass.

KORGLAZE is mixed with graphite, the two products simply stirred together cold. Cores may be dipped or sprayed, and treated hot or cold. KORGLAZE holds the graphite to a smooth top surface, bonding tightly with the sand. The result is a surface as smooth as silk. When we point out that the difference between a fairly smooth and a completely smooth core surface may increase your business, we are not pointing out anything new. The suggestion may serve to remind you, however, that you CAN make smoother cores—KORGLAZE will do it for you.

KO



A 5&P CALENDAR GIRL CAN PERFORM THIS JOB WITH EASE



THIS LITTLE LADY FEEDS THE BINDER TO MODEL "60" *SPEEDMULLOR*

The SPEEDMULLOR

mulls, cools and constantly aerates the sand . . . while it is in suspension

The *Speedmullor* mulls and aerates the sand between two pieces of live rubber; namely, the rubber-lined wall and the rubber tire which cannot crush the silica grains, even though the *Speedmullor* delivers far greater pressure against the sand. This is accomplished by squeezing one grain of sand against another, and turning it over some 200 times a minute with a resultant increase in aeration and agitation due to the speed of the plows, which keeps the sand in suspension at all times. Compare this resilient squeezing action and constant aeration with the crushing and crunching of massive steel mulling elements which wear themselves out while breaking down the silica grains.

THESE GIRLS ARE METICULOUSLY NEAT ABOUT THEIR WORK

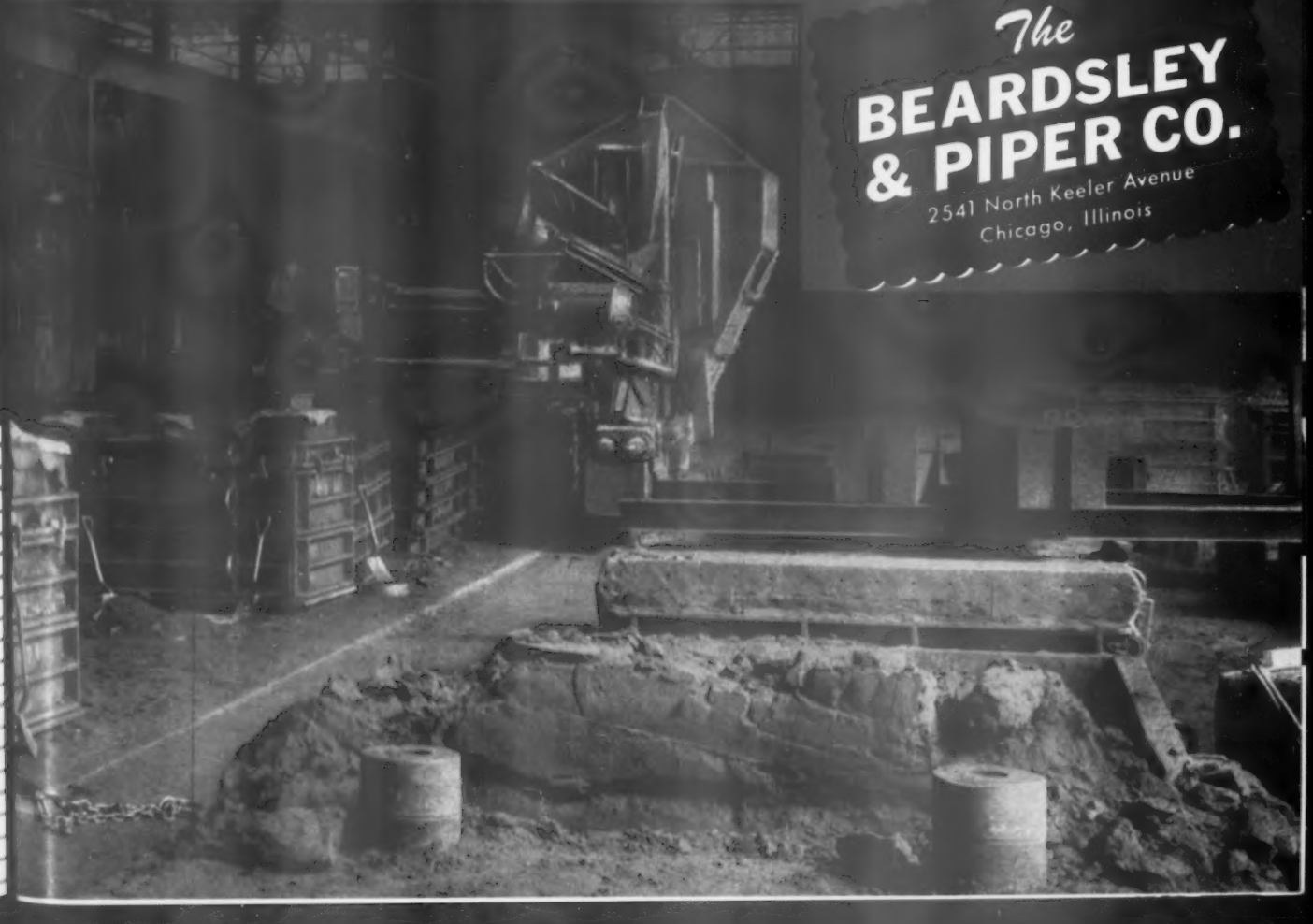
SAND HANDLING
SPEEDMULLORS
SANDSLINGERS

SPEEDSLINGERS
SHAKEOUT EQUIPMENT
SANDCONDITIONING

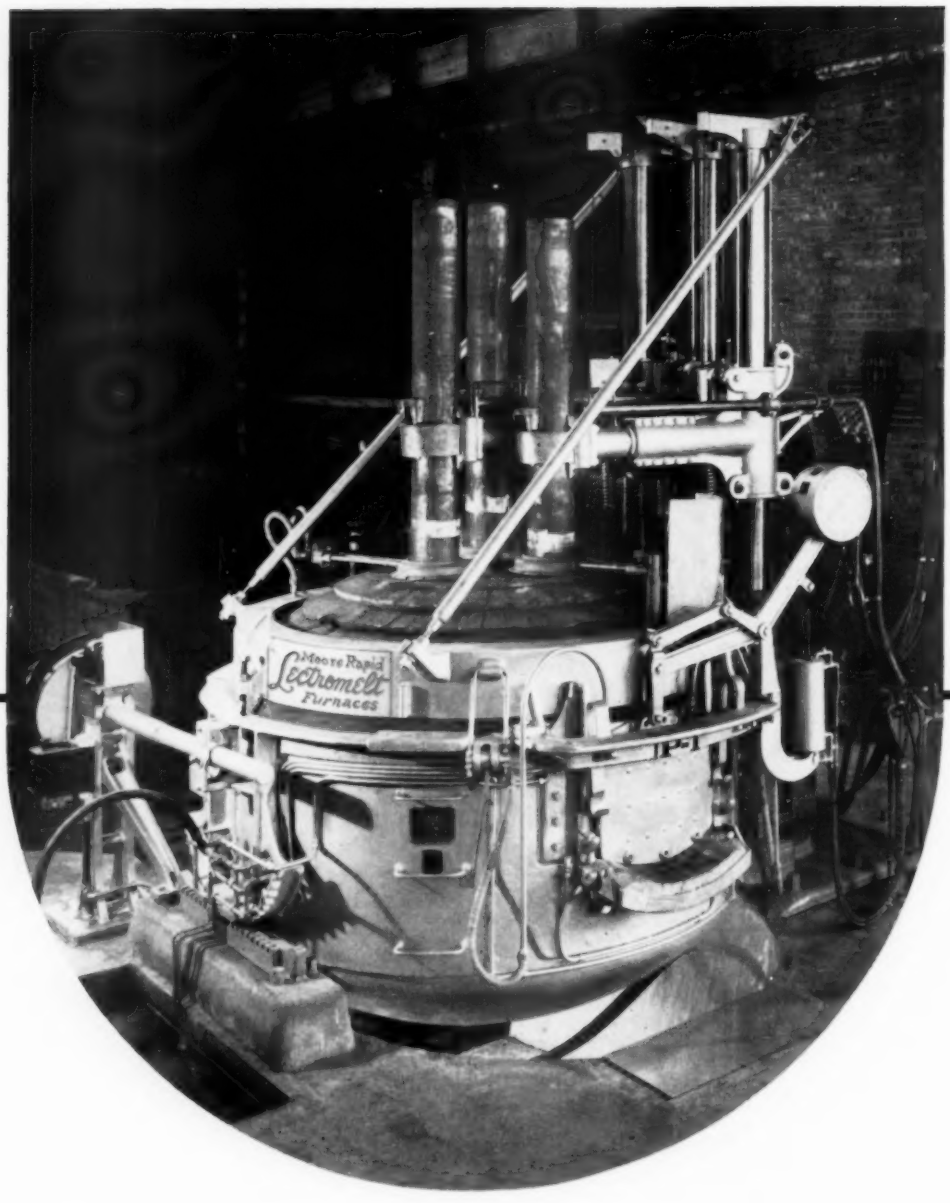
The SPEEDSLINGER

rams 1,000,000 pounds of sand in 8 hours—harder than ever rammed before

The cessation of war brings with it an economic upheaval equal if not greater than the changeover from peacetime competition to all-out war production. It is not too early now to plan for peace. The Better Methods that speed production today are the same economies which will enable profitable operations when peace comes, competition returns and profits accrue only to well planned operating performance. A *Speedslinger* or *Sandslinger* in your plant today enables you to produce with the greatest possible speed all the castings your schedule demands. Tomorrow that same *Speedslinger* or *Sandslinger* will enable you to compete on a profitable basis. There is a *Speedslinger* or a *Sandslinger* to suit your particular and most exacting requirements.



The
BEARDSLEY & PIPER CO.
2541 North Keeler Avenue
Chicago, Illinois



MOORE RAPID *Lectromelt* FURNACES

LECTROMELT top charge furnaces are an investment in economic steel production. Because of the reduction in charging time and consequent lowering of furnace heat loss during the operation an increase in output per man hour is obtained. Top charge furnaces are available in capacities from 100 tons to 250 pounds. Illustrated is a 3-ton, style "PT" LECTROMELT with roof in normal operating position. Write for the LECTROMELT catalog.

PITTSBURGH LECTROMELT FURNACE CORPORATION
Pittsburgh, Pennsylvania

YOU CAN HAVE "All the Tricks of the Trade" ALWAYS AT YOUR ELBOW!

There are "tricks" in every trade—those little short-cuts that step up production—simple precautions that prevent costly troubles—knowledge of where to look to find the causes of difficulties.

And here's a man who has made it his business to learn all of them—both from technical study and practice as a metallurgist and from actually working long hours in foundries of every type.

He's the Republic Pig Iron Metallurgist—and he's "Always at Your Elbow" ready to apply those "tricks" in your foundry to increase your output of sound, flawless castings.

His service is especially helpful—*and valuable to you*—today when increasing wartime demands must be met.

Just tell us when you would like him to call. Your request will involve no obligation whatever.

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
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Export Department: Chrysler Building, New York, New York

Republic

PIG IRON

ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

REPUBLIC STEEL — PRODUCTION FOR VICTORY

"CHATEAUGAY"
Low-Phosphorus, Copper-Free

"REPUBLIC"
(Northern)
Foundry, Basic and Malleable

"PIONEER"
(Southern)
Foundry and Basic

NOW-more than ever

YOUR "MELT" NEEDS famous CORNELL FLUX

FAMOUS CORNELL FLUXES

for Aluminum and Brass

- Famous CORNELL Aluminum FLUX will give you unequalled results *free from the obnoxious fumes* that accompany ordinary fluxing compounds. This feature alone should prompt your investigation.

- Famous CORNELL Brass FLUX merits special consideration in these times when you must use large quantities of unusually dirty borings and sweepings—and yet get close-grained castings and especially castings that must withstand a pressure test.

THE purging, purifying, quality raising action of Famous CORNELL FLUX will begin the moment you toss the first brick into your cupola.

Within a few days the results of consistent use will be definitely apparent.

Despite the necessity of using larger quantities of inferior scrap today you'll be producing sounder castings—heats will be shortened—iron will be hotter and more fluid.

You'll get better results than with fluorspar *which is mounting in cost daily* and you'll save on fuel and limestone.

NOW is the time to prove these statements. Write for literature and complete information that will enable you to prove these statements to your entire satisfaction.

The CLEVELAND FLUX Co.

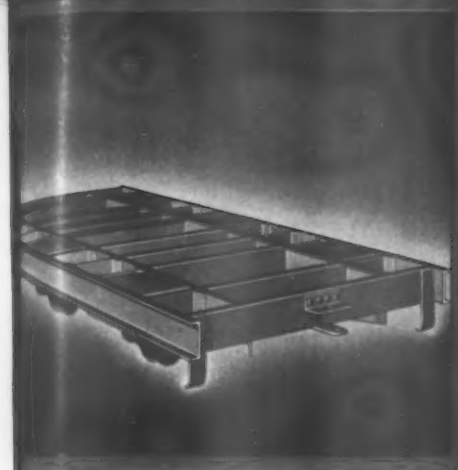
1026-34 Main St., N.W., Cleveland, Ohio

Manufacturers of Iron, Brass and Aluminum Flux Since 1917

FOUNDRY EQUIPMENT "SPECIALS"

(Good Delivery)

• Made-to-order *especially for wartime service in the foundry,* each one of these units serves a highly useful foundry function. We can supply you with a standard unit as illustrated or will adapt it to your needs OR DESIGN A UNIT FOR YOU as indicated. Write, wire or phone us . . . we can and will serve you well.



CORE OVEN TRUCKS

Custom-built to your requirements. Tell us your oven and track dimensions, load factor. Designed to move easily at high or low temperatures without deflection.

CORE RACKS

They're *adjustable!* Shelves of removable T-bars facilitate loading. Construction eliminates core-cracking from deflection.

UTILITY DUMP BUCKETS

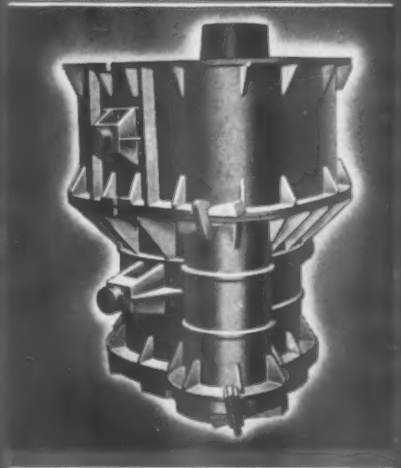
Capacities to 200 cu. ft. Perfectly balanced and locked in transit. Automatically ejects load and rights self by tripping locking lever. Ruggedly built.

HOT-TRANSFER BUCKETS

Extra-strong construction to withstand abuse of rush schedules and three-shift production. Reinforced bottom and all-welded construction. Any size.

DISTRIBUTION BUCKETS

Carries up to 5 tons safely. Ejection automatic on removal front chain. This unit has met enthusiastic response from numerous foundry users.



SPECIAL FLASKS

This flask is typical of the special shapes we have been called upon to design for unusual requirements. Precision-built.

ELECTRODE TRUCKS

Electric furnace operators have found this unit very satisfactory for safer handling of carbon electrodes.

JIB CRANES

Free-standing type. Handles up to 2 tons in a 360 degree travel—18′ boom, 36′ span. Height adjustable up to 15′. Furnished ready for installation inside or out.

WM. F. EICHFELD & SONS CO.

ENGINEERING SPECIALISTS IN METAL

North 30th St. MILWAUKEE, WISC., U. S. A. Phone: KILbourn 7060

RED STREAK FLANGES

Pat. 2,121,656

FOR FOUNDRY SNAGGING

. . . a patented feature exclusive with Abrasive Company high speed resinoid bonded snagging wheels with 6, 10 and 12-inch hole sizes . . . for use on swing frame and floor stand grinders.

Outstanding features include easier mounting, a better spindle fit and an additional safety factor . . . *at no extra cost!*

Supplied in grain and grades that give fast cutting action consistent with long wheel life. Write for details!

Billet Grinding	
High Carbon and High Speed Steel	14 -PB -B5
Stainless and Alloy Steel	14 -RB -H3 H14 -UB -A3
Cast Iron	B146 -OB -B7
Steel Castings	
Floor Stand	14 -OB -K5
Swing Frame	12 -PB -E5

ABRASIVE COMPANY GRINDING WHEELS

. . . are basic tools for War Production. Their efficient cutting action on a myriad of grinding applications is essential for the manufacture of vital war materiel.

For example, castings, plates and parts for tanks, guns, ships and airplanes are first rough ground in foundries and steel mills. "ABRASIVE" Wheels are proving their worth on these important grinding jobs. Chances are you can benefit from their use on your foundry snagging work—on swing frame, floor stand and portable grinders.

Help us to help you—by providing the highest available priority ratings on your grinding wheel purchase orders.

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

TACONY & FRALEY STS., PHILADELPHIA, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

Attention

Makers of Aluminum and Magnesium Castings

Resin Modified Core Oil

VELSICOL "V-45-D"

Makes Possible Better Results—Faster Work

You will find VELSICOL V-45-D particularly well adapted to the special requirements of aluminum and magnesium casting. It assures good collapsibility—it is fast drying and has a remarkably low gas content which results in more rapid, more economical production of perfect cores. Send for a sample and see for yourself how well it works.

VELSICOL

VELSICOL CORPORATION

120 EAST PEARSON STREET • CHICAGO, ILLINOIS

VELSICOL
CORPORATION
TRADE MARK REGISTERED

Resin Modified Core Oils

Long Favored

FOR

GRAY IRON, STEEL & MALLEABLE CASTINGS

In America's leading foundries, many of the largest and many of the most complicated castings are produced with cores made with VELSICOL CORE OILS. One reason for the widespread success of the VELSICOL oils is their uniform quality which rigid production controls maintain. As the largest and pioneer producer of petroleum resins for foundry use, VELSICOL assures a reliable source of supply.

Widely Used Also for

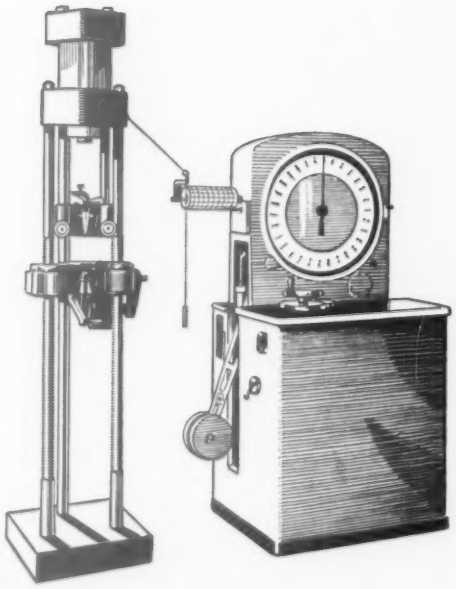
BRASS, BRONZE AND SIMILAR NON-FERROUS CASTINGS

(FULL INFORMATION ON REQUEST)

VELSICOL CORPORATION 120 E. PEARSON ST., CHICAGO
PLANT AND REFINERY, MARSHALL, IL

Close-up OF A PRODUCTION EXPEDITER

Because of the urgent needs of war, many materials must be tested for service on a production basis. For expediting production testing, only Riehle Universal Hydraulic Testing Machines offer ONE HANDWHEEL CONTROL. Straining head speeds are completely controlled from fast forward to fast return in one revolution. Provides precise control for slow speeds. Number of testing speeds is unlimited because regulation is stepless. Operation is so simple, Riehle Testing Machines can be operated by anyone with a minimum of training. These machines will help you to produce more and better equipment in the battle of production.



Model P-3 Universal type machine expressly designed for routine testing of wire, sheets and light bars—as well as exacting research work. Open gripping heads at convenient height. Capacities up to 30,000 pounds.

RIEHLE TESTING MACHINES

Division of American Machine and Metals, Inc., East Moline, Illinois

"One test is worth a thousand expert opinions"

UNIVERSAL MACHINES FOR TENSION, COMPRESSION AND TRANSVERSE TESTING • IMPACT TESTERS • VICKERS HARDNESS MACHINES • BRINNELL HARDNESS TESTERS AND MEASURING INSTRUMENTS

UNIVERSAL JOLT SQUEEZE

A Simple, Compact Production U

BUILT TO MEET MODERN FOUNDRY REQUIREMENTS

● It operates equally well as a jolt-squeeze-pattern-draw machine or as a plain jolt squeezer.

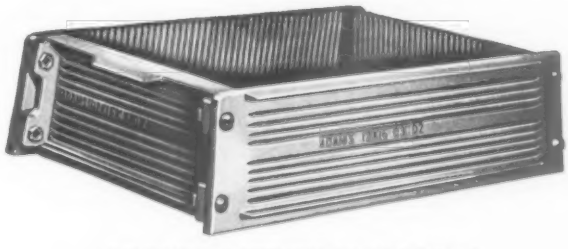
Adjustable arms on the lift table will accommodate any size of flask within the range of the machine.

Quickly adjusted for 3″, 4″, 5″ or 6″ draw, with rapid setting for any desired speed of lift or drop.

Two sizes—Stationary and Portable—10″ and 12″ squeeze pistons—32″ and 38″ between side rods. Also available in the post type.

ADAMS CHERRY SNAP FLASKS
Straight or Tapered

ADAMS CHERRY SLIP FLASKS



ADAMS CAST IRON JACKETS

Quick Delivery

ON CUSTOM-BUILT FLASK EQUIPMENT

To be effective, flask equipment should be carefully selected and made to fit the job. Another requirement these days is prompt delivery, as the need for this equipment cannot always be anticipated.

Adams Flask Equipment—Snap Flasks, Slip Flasks, Jackets and Bands—is made to your order, and we have expanded our facilities to the point where, even under present conditions, we can offer unusually prompt service.

To assure proper fit, and greatest satisfaction, specify both Adams Flasks and Adams Jackets on your next order.

Round and Special Shapes

can be furnished to conform with your specifications.

THE ★ ADAMS ★ *Company*
DUBUQUE, IOWA
1883—Our 60th Year—1943

DIRECT DRIVE

V-BELT DRIVE

COUPLED DRIVE

Any Style—Large or Small!

NORTH AMERICAN

TURBO BLOWERS

ALL HAVE THE SAME SUPERIOR QUALITIES

STURDY CONSTRUCTION

Each NORTH AMERICAN Turbo Blower has a sturdy base of welded steel. The housings are of cast iron to insure rigidity and the gradual contours so necessary for smooth efficient flow of air.

SMOOTH QUIET OPERATION

The light weight, fabricated impellers are perfectly balanced, thereby guaranteeing quiet, vibrationless operation. Bearing failures disappear, since each NORTH AMERICAN Turbo Blower is carefully tested at the plant before shipment. Pressure, volume, balance, speed, current consumption and proper electrical characteristics of the motor must be correct before the Blower can be shipped.

EASY TO INSTALL

No special padding or special foundations are required when you install a NORTH AMERICAN Turbo Blower. In an emergency, however, you can change the position of discharge, disassemble or assemble the entire machine easily and quickly.

SIZE SELECTION

From long experience in combustion engineering, our Field Engineers know the correct volume and pressure necessary to make your job click. Let us save you money by recommending the right sized Blower for your job—not too large—not too small. NORTH AMERICAN Turbo Blowers are available from 4 oz. to 32 oz. and from 60 cfm to 4300 cfm. Write for our latest blower literature.

THE NORTH AMERICAN MANUFACTURING COMPANY

MANUFACTURERS OF INDUSTRIAL FUEL BURNING EQUIPMENT FOR GAS OR OIL

BRANCH OFFICES *with* FIELD ENGINEERS *in* PRINCIPAL CITIES

CLEVELAND, OHIO

HOW YOU Can Help Our Fighting Boys

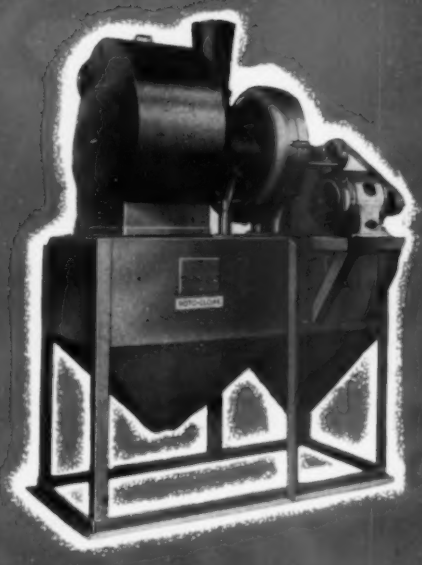
Today almost every patriotic American is asking, "What can I do as a non-combatant to assure Victory for our Fighting Boys in the farflung war fronts of this World?"

Foundrymen, even though not able to shoulder arms and join the ranks, are part of one of America's most vital industries. Those of you owning or operating Herman Molding Machines can have the satisfaction of knowing that by no other method could you make molds for vitally needed castings so rapidly, accurately, or efficiently. To those of you who have not yet experienced the deep satisfaction of eliminating production bottlenecks with these speedy, sturdy, economical operating Machines, we extend an invitation to have our experienced engineers help you with your molding problems. No obligation, of course.

"BUY WAR BONDS AND STAMPS"

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

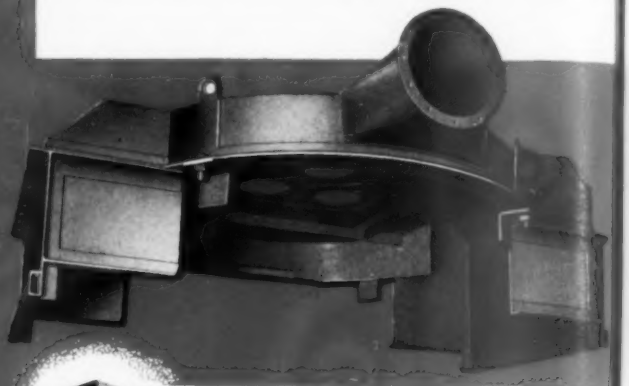


TYPE D ROTO-CLONE WITH SKIMMER PRECLEANER

A two-stage dry centrifugal arrangement, capable of handling heavy loads of abrasive material with high dust separating efficiency.

ELECTRIC FURNACE EXHAUST HOOD

A patented method of applying local exhaust to electric furnace fumes. Designed to fit individual requirements, free from interference with charging and pouring.



ROTO-CLONE TYPE N

Designed to meet special requirements of magnesium dust control and ideally suited to all buffing operations. Small Type N units may be located directly in back of grinding or polishing stand. Material collected with high efficiency and stored safely under water.

ROTO-CLONE TYPE N GRINDING BENCH

High efficiency wet type collector with integral workbench for safe control of magnesium dust, particularly from flexible shaft grinding.

DOWNDRAFT EXHAUST ARRANGEMENT

Completely controls fine dust from portable grinding and increases production. Benches available in wide range of sizes and designs for any size casting.

FINES CLASSIFIER FOR FOUNDRY SAND

Provides effective removal of fines by means of exhaust system. Positive separation by cascade action, quickly adjustable for varying permeability requirements. Classifier is usually mounted above sand storage.

Foremost IN FOUNDRY DUST ENGINEERING

THE application of Roto-Clone dust control to foundries embraces every operation where dust is either a hazard or a nuisance.

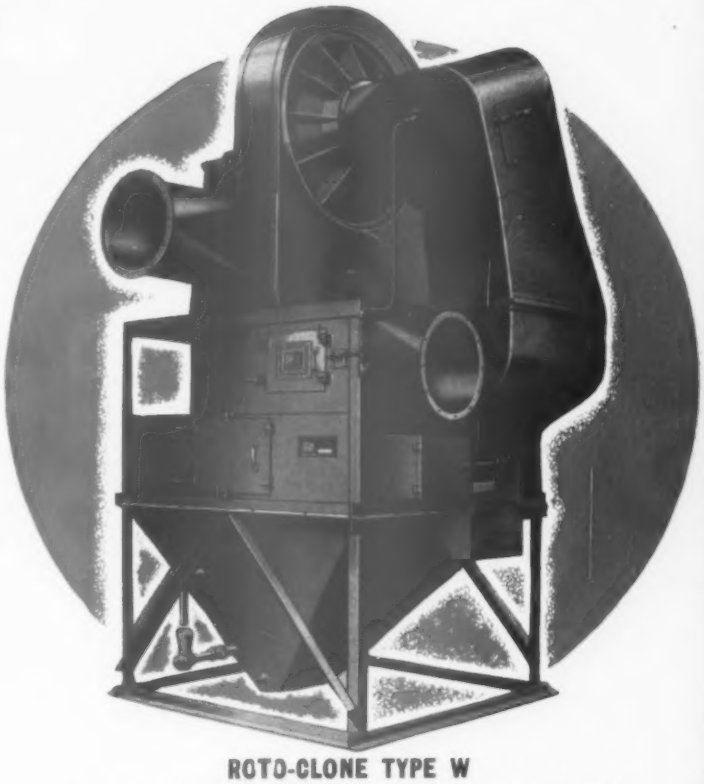
The necessity of providing adequate dust control for accelerated production schedules is responsible for the development of several new Roto-Clone designs and ingenious methods of application based on extensive experience in foundry practice.

Roto-Clones are available in three types—Type W, the Wet Dynamic Precipitator for general foundry dust control, particularly shakeout, sand conditioning, and abrasive cleaning; Type D, the Dry Dynamic Precipitator for grinding, snagging, portable and swing frame grinders; and Type N, the new Hydro-Dynamic Precipitator, especially designed for the safe control of hazardous magnesium dust.

Bulletins and data sheets describing the use of the Roto-Clone are available on request.

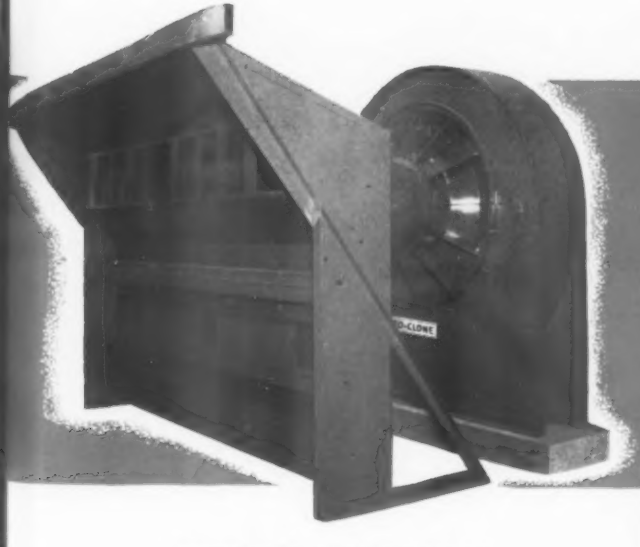
For convenience use the coupon.

AMERICAN AIR FILTER CO., INC.
Incorporated
266 Central Ave., Louisville, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.



ROTO-CLONE TYPE W

Outstanding in foundry dust control and universally applied to sand conditioning, shakeout and abrasive cleaning. Dust effectively precipitated in moving water film. Eliminates secondary dust problem and assures constant exhaust air volume.



SHAKEOUT EXHAUST HOOD

Most practical method of dust control for large shakeouts serviced by overhead cranes. Adjustable intake louvres counteract convection currents and cross drafts. Heavily constructed to withstand foundry service.

AAF

ROTO-CLONE

DUST CONTROL SYSTEMS

American Air Filter Co.,
266 Central Ave., Louisville, Kentucky

Gentlemen:—Please send me data on the following special Roto-Clone applications.

.....

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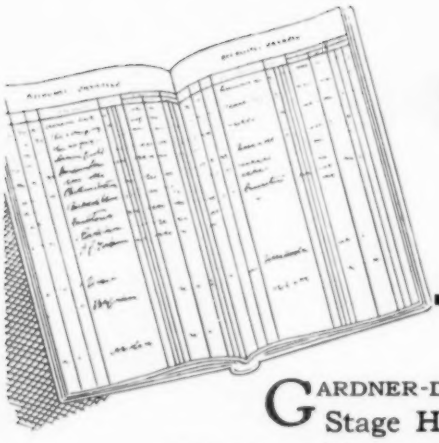
Name .....

Company .....

Address .....



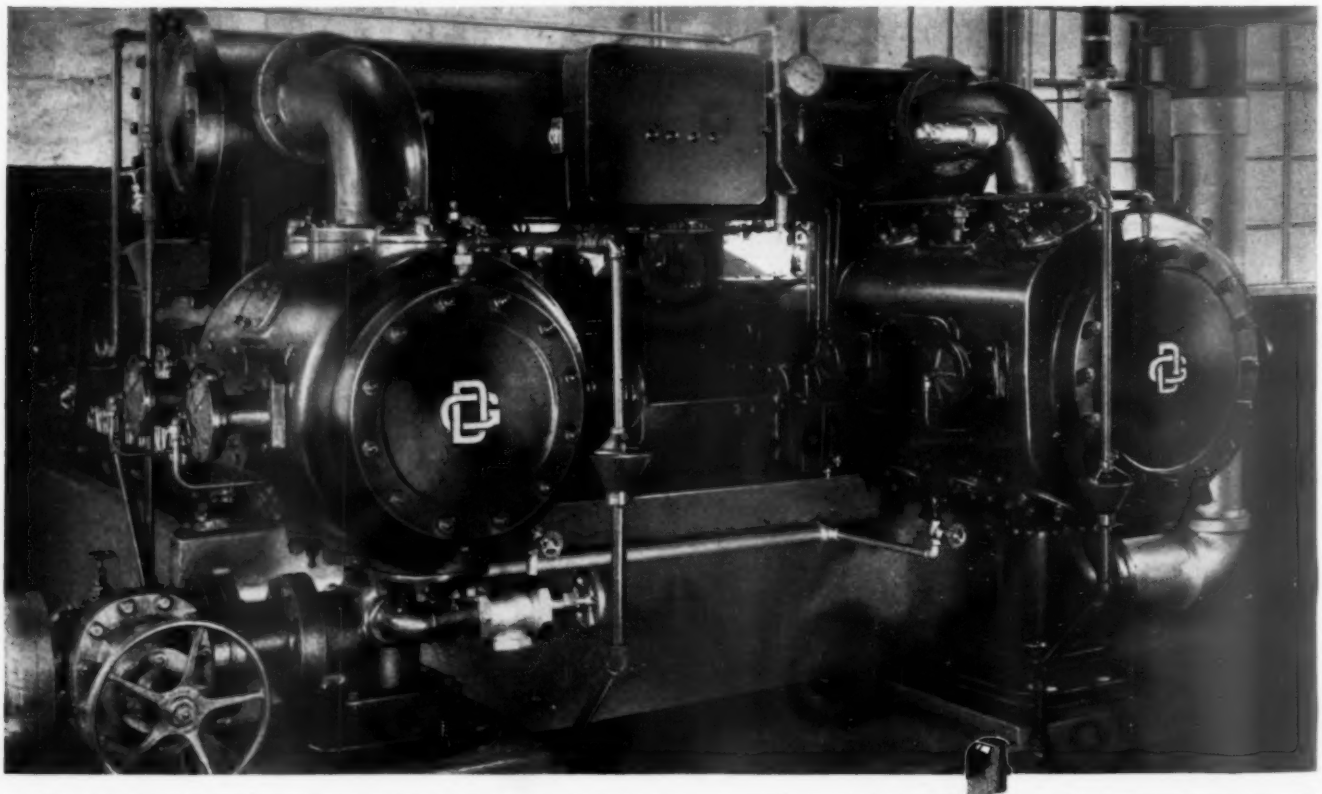
The story of its success is written in cost ledgers

GARDNER-DENVER "HA" Two-Stage Horizontal Compressors are writing a success story in the cost ledgers of many a successful plant.

Engineered for continuous heavy-duty service, they have a high compressor efficiency which is assured by such features as unrestricted air passages and large valve areas. Their greater air capacity is under constant, automatic control—is regulated to fit your air needs.

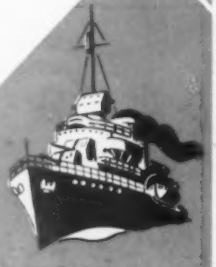
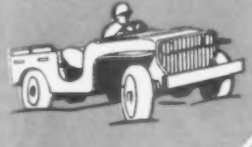
For extra strength and durability through the years, frame, cylinders, pistons, and other vital parts are cast of GarDurloy—the stronger, tougher cast iron developed by Gardner-Denver. Timken main bearings provide smooth, trouble-free economical operation; seldom require adjustment.

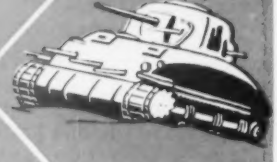
For further information on Gardner-Denver "HA" Two-Stage Horizontal Air Compressors, write Gardner-Denver Company, Quincy, Illinois.



GARDNER-DENVER *Since 1859*

A PATTERN FOR A GREATER AMERICA



In the America we know and love, liberty is synonomous with life itself. We are exerting every effort, not only to do our part, but to give more than is expected of us in the great struggle in which our beloved country is engaged today. As always, our executives are thinking ahead and when the last all-clear is sounded, America will then find us ready to stand shoulder to shoulder with other industries in creating a pattern for a greater and more prosperous home life.

Wood and Metal Patterns • Keller and Duplicator Work • Machine Work • Mallory Metals • Beryllium Copper • Monel Metal • Everdur Castings.

Copper Castings of Highest Electrical Conductivity

CITY PATTERN WORKS

Brass, Bronze and Aluminum Castings

1165 HARPER AVE. AT RIVARD ST.

DETROIT, MICHIGAN

SUPER REFRACTORIES BY CARBORUNDUM

INCREASE PRODUCTION . . . CUT MAINTENANCE COSTS . . . REDUCE OPERATING COSTS . . . INCREASE EFFICIENCY

In applications like these . . .

Aluminum Melting Furnaces	Electric Furnaces	Muriatic Acid Furnaces
Annealing Furnaces	Heat Treating Furnaces	Oil Refining Stills
Boiler Settings	Hydrocarbon Cracking Regenerators	Reheating Furnaces
Brass Melting Furnaces	Lime Kilns	Rotary Kilns
By-Product Coke Ovens	Magnesium Melting Furnaces	Tunnel Kilns
Carburizing Furnaces	Muffle Furnaces	Water Gas Sets
Ceramic Kilns	Muffle Roasters	Zinc Refining
Chemical Process Furnaces		Zinc Retorts

THE chart below gives you a quick summary of the characteristics of five super refractories by Carborundum which are doing a big job on the war production front. Each of these super refractories is made in many modified compositions providing a wide range of physical properties.

Please remember that our entire current production is going to war industries.

CARBOFRAX

1. Heat Conductivity, 109 Btu.
2. Refractoriness, PCE Cone 37-40
3. High Spalling Resistance
4. High Abrasion Resistance
5. Low Thermal Expansion
6. Specific Heat, 0.285
7. Weight, 9-in. Straight, 9.25 lb.

MULLFRAX

1. Heat Conductivity, 15 Btu.
2. Refractoriness, PCE Cone 38-39
3. High Spalling Resistance
4. Medium Abrasion Resistance
5. Medium Thermal Expansion
6. Weight, 9-in. Straight, 9.5 lb.

ALFRAX BI

1. Heat Conductivity, 7 Btu.
2. Refractoriness, PCE Cone 38
3. Good Spalling Resistance
4. Low Abrasion Resistance
5. Medium Thermal Expansion
6. Specific Heat, 0.320
7. Weight, 9-in. Straight, 4.5 lb.

ALFRAX K

1. Heat Conductivity, 21 Btu.
2. Refractoriness, PCE Cone 37-39
3. Medium Spalling Resistance
4. High Abrasion Resistance
5. Medium Thermal Expansion
6. Specific Heat, 0.330
7. Weight, 9-in. Straight, 10.1 lb.

MULLFRAX S

1. Heat Conductivity, 7 Btu.
2. Refractoriness, PCE Cone 37-38
3. High Spalling Resistance
4. Medium Abrasion Resistance
5. Medium Thermal Expansion
6. Weight, 9-in. Straight, 7.8 lb.

REFRACTORY CARBORUNDUM PRODUCTS

Refractory Division, **THE CARBORUNDUM COMPANY,** *Perth Amboy, N. J.*

REG. U. S. PAT. OFF.

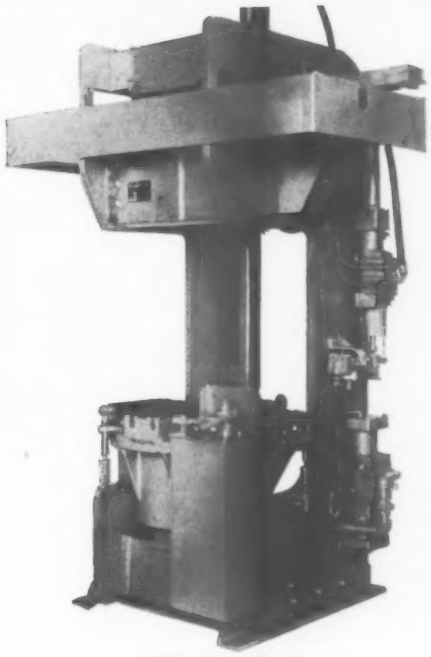
MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

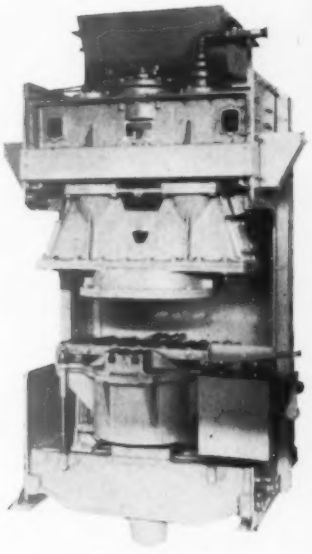
(Carborundum, Carbofrax, Alfrax and Mullfrax are registered trade-marks of and indicate manufacture by The Carborundum Company)

CORE BLOWERS *Exclusively*

DEMMLER No. 4E



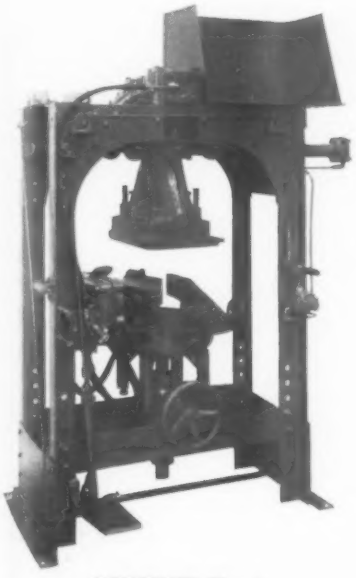
DEMMLER No. 8



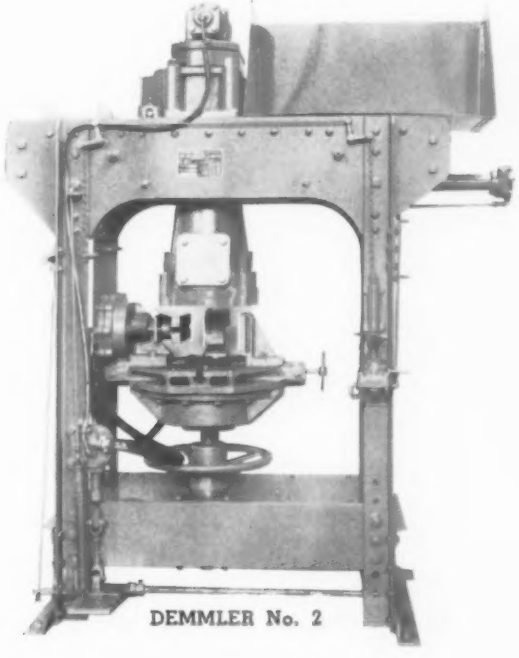
DEMMLER No. 5

Recent additions to our line are the No. 4E and No. 5 machines, designed for blowing cores for large airplane motor castings. Features include an accurate core box draw, table equipped with Timken rollers, control mechanism totally enclosed.

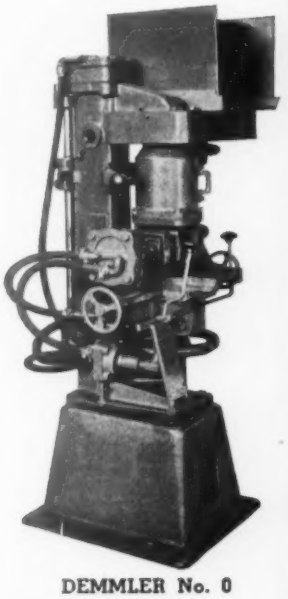
At this time we have capacity to make good deliveries, and suggest that you check with us on your anticipated requirements.



DEMMLER No. 1



DEMMLER No. 2



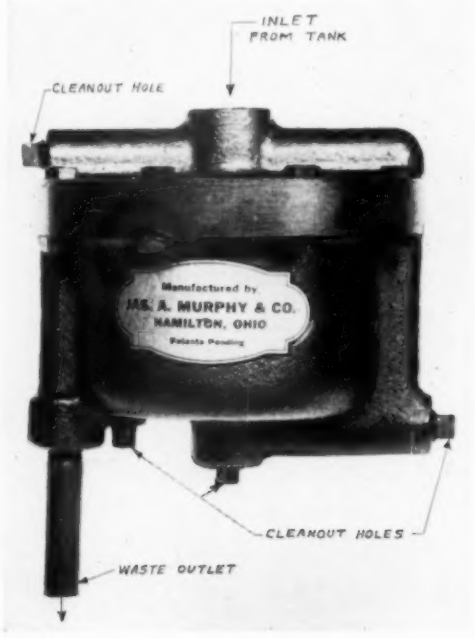
DEMMLER No. 0

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS

DEMMLER

For Efficiency in
CORE OVEN OPERATION

A MURPHY TRAP
WILL KEEP
THE AIR TANK DRY



MURPHY SEPARATORS
COMPLETE WATER ELIMINATION
Fully Automatic

THE MURPHY PISTOL SPRAYER

Thousands in use all over the world. A thirty-three year record of efficiency. Four sizes ⅛" to ½".

● Your Core Ovens are only as efficient as the control apparatus which guards them. Murphy Automatic Water Traps and Air Separators are used in thousands of installations. Investigate these accessories and what they can do for your core oven operation.

Send for Literature

AUTOMATIC SEPARATORS — AFTER COOLERS — HAMILTON SPRAY GUNS — EXTRUSION MACHINES

JAMES A. MURPHY & COMPANY
HAMILTON, OHIO

Ohio Ferro-Alloys

BASIC in the production of

Steels to Win the War

Ferro-Silicon 50%
Ferro-Silicon 75%
High Carbon Ferro Chrome
High Carbon Ferro-Manganese
BOROSIL*
SIMANAL*

* BOROSIL—3% to 4% Boron, approximately 40% to 45% Silicon, balance Iron.
SIMANAL—20% Si., 20% Mn., 20% Al., balance Iron.
Descriptive booklets on request.

PHILO RAINIER

Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago Detroit Pittsburgh Tacoma

IRON FOUNDRY OPERATORS—

INCREASE YOUR WAR PRODUCTION

IMPROVE YOUR PRODUCTS

V-Foundry Alloys and Graphidox #4

• **V-FOUNDRY ALLOYS**—(chromium silicon manganese alloys)—reduce depth and variation in depth of chill in cast iron—stabilize and slightly increase tensile strength—improve machinability with same or slightly increased hardness—eliminate hard spots

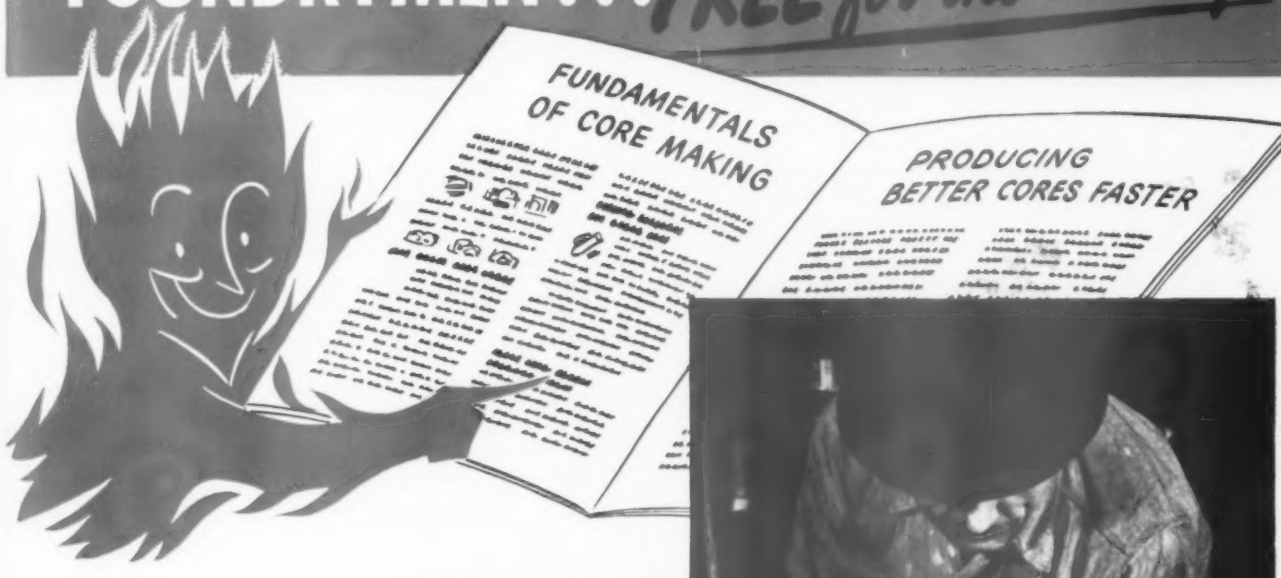
• **GRAPHIDOX**—graphitizer in cast irons—powerful agent for converting white into gray iron—eliminates hard spots, reduces and stabilizes chill depth in plain or alloy irons—provides unusual control where properties must be improved without increase in hardness

We are pleased to announce that **STEEL SALES CORPORATION** and **WILLIAMS AND CO.** are now distributors of the above alloys to iron foundries in their respective districts

STEEL SALES CORPORATION
General Office: 3348 South Pulaski Road
CHICAGO, ILLINOIS
Warehouses: Chicago, Detroit, St. Louis

WILLIAMS & COMPANY
General Office: 901 Pennsylvania Ave., N. S.
PITTSBURGH, PENNA.
Warehouses: Pittsburgh, Cleveland, Cincinnati

HERE'S HELP FOR YOUR NEW FOUNDRYMEN . . . *FREE for the asking!*



Arrival of scores of *new* workers in foundries has made it hard for busy foremen to explain the "how's" and "why's" of core-making to all the newcomers. There simply hasn't been time.

To help solve this manpower problem by supplying the practical "know how" facts, Despatch now offers a handy, helpful booklet full of valuable information for new employees.

VALUABLE BOOKLET ON CORE MAKING

There is helpful data on sands, oils and binders . . . need for moisture control . . . characteristics of good cores . . . and important information on the types of modern ovens best suited to core baking.

Illustrated with photos and cartoons, this booklet is just the thing that foundrymen really *enjoy* reading — because it is short, to-the-point and of practical value on the job.

WRITE FOR FREE COPY

Send for this valuable, interesting booklet today. Ask for *"Fundamentals of Core Making"* Bulletin 31. (Plant foremen: indicate number of copies you need for distribution.)

Even a Rookie can handle a *Despatch* core oven, do as good a job as an old-timer.

This is because *all* cores in the oven chamber, regardless of position, receive the same fast, uniform baking. And automatic control of heat eliminates inspection check-ups.

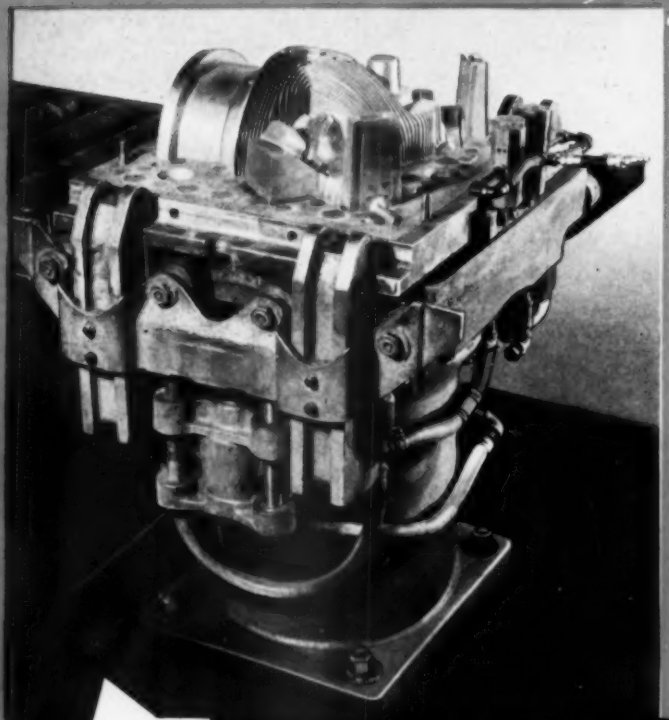
Excellent for the largest production job; makes best use of space, fuel and manpower. Types to fit all plants. Latest material-handling equipment.

DESPATCH OVEN COMPANY MINNEAPOLIS

ASK FOR DETAILS about these new Despatch core-baking ovens. For specific problems, call Despatch *Engineering Service.*

Again MILWAUKEE Score

AIRPLANE CYLINDER HEAD MOLDS ★



1

Pattern clamped to Vibrate Jolt Machine where facing sand is rammed into fins by vibrating and jolting.

BOTH the method and the molding machines, to produce an airplane cylinder head mold a minute, were developed by Milwaukee Foundry Equipment Engineers and the Caterpillar Tractor Company Foundry Organization for Caterpillar's new Aluminum Foundry at Peoria. The method calls for the performance of operations progres-

The machine which performs the first operation (ramming sand around the fins) is a special Vibrate Jolt Machine. The pattern plate is rolled in on rollers which recede when the pattern plate is clamped firmly to the table of the machine. The second operation (finish ramming around the fins after nails are set) is performed on a Plain Jolt Machine equipped with rollers and clamps.

2

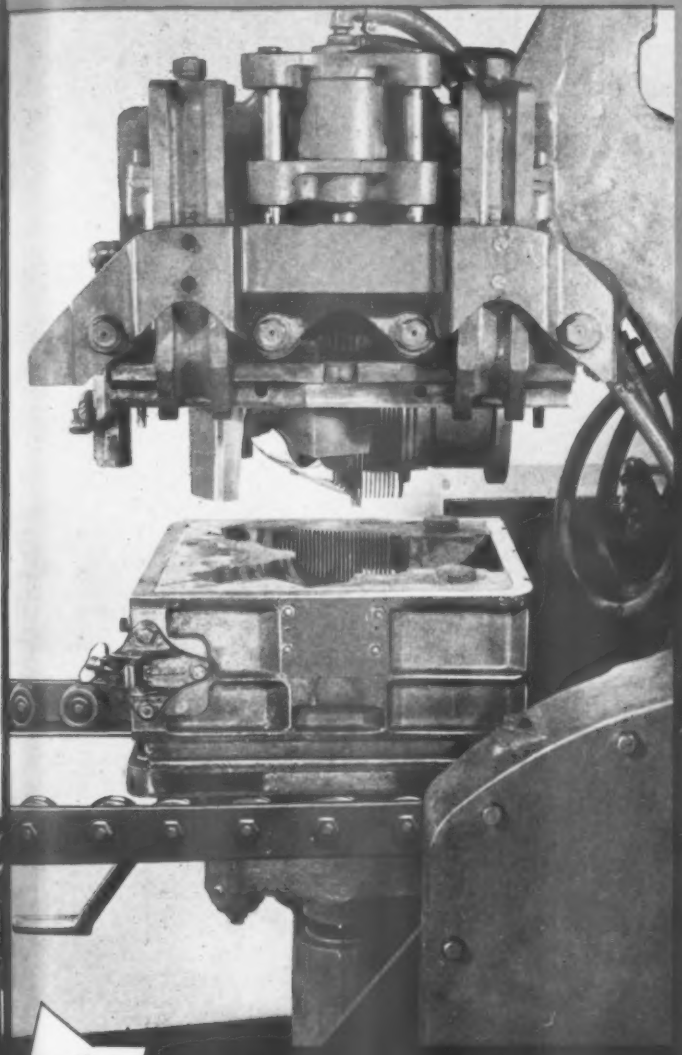
Completely rammed mold clamped in Hydraulic Machine, ready to be rolled over and drawn.

MILWAUKEE

MANUFACTURERS OF MOLDING MACHINES AND BRIQUETTING PRESSES

ONE A MINUTE!

sively at four stations, so that less than a minute is required at any one station. Based on actual tests, it is estimated that only ⅛ the manpower is required to make molds by this new method.



3 Mold drawn from pattern, resting on rollers for removal to spray position.

4 Finished mold, sprayed, ready to be placed on oven racks.

The last operation (rolling over and drawing) is performed on a Special Hydraulic Machine operated by push buttons and equipped with rollers and pattern plate clamps. The roll-over action is positive and absolutely smooth. The draw is controlled by a rotary valve which can be regulated for any desired varying speed for any portion of the stroke. The drawn mold is gently deposited on a precision conveyor for transfer to the spray station.

Foundry Equipment Co.

238 WEST PIERCE STREET • MILWAUKEE, WISCONSIN, U.S.A

ANNOUNCING.....

IRONTON CARO-LINE

A Monolithic Lining for...

LADLES OF ALL SIZES SIDE BLOW CONVERTERS, ACID ELECTRIC FURNACE BOTTOMS, CUPOLA BREAST AND SLAG HOLES . . . . . .

IRONTON CARO-LINE is a highly siliceous refractory material. It has been purified by nature's geologic processes and blended with ceramic minerals to give uniform bonding properties. This product successfully replaces similar materials formerly imported from Germany. Its high refractoriness prevents slagging off under high tapping temperature and its fine grain contributes to excellent workability for use as a ramming material. IRONTON CARO-LINE is shipped in 100-lb. bags for convenience and its dry powdery to lumpy condition is readily workable in a muller type mixer.

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

GREEN STRENGTH

"The maximum resistance which a molded sand, while tempered, offers to deformation."

A sand which "feels" good will make a good mold, but may not produce a good casting.

Every material used to secure Green Strength influences Flowability, Mold Hardness, Permeability, Expansion and Hot Strength.

Cereal Bonds produce Green Strength and low Hot Strength; Clays produce Green Strength and high Hot Strength.

Produce smooth castings and eliminate defects with good sand mixtures.

There's a McCormick Bond for every job.

J. S. McCORMICK COMPANY
25TH STREET AND A. V. R. R.
PITTSBURGH, PA.

LION BINDER — EASY CLEANER CORE COMPOUND — MOREBOND

● 33rd YEAR

BINDARENE

Core Binder

* AN ORGANIC BINDER
* POWDER AND LIQUID
* MAKES STRONG CORES
* SHAKES OUT CLEAN
* BAKES QUICKLY
* STABLE PRICES
* LOW COST

Supplied through your jobber or direct from us . . . write for test samples

ADDITIONAL JOBBER CONNECTIONS DESIRED, CORRESPONDENCE INVITED

BINDARENE SALES DIVISION

INTERNATIONAL PAPER COMPANY

220 EAST 42nd STREET, NEW YORK

MAEHLER

CORE AND MOLD OVENS

• Maehler builds a complete range of oil and gas fired and electrically heated recirculating airheat core and mold ovens — and accessory handling equipment. These ovens feature heat uniformity, high output, low cost and safety.

AIRHEAT CONVERSION UNITS

• Maehler heaters and recirculating airheat systems can be installed to modernize old style brick or metal ovens. Results from many such installations have been outstanding — outputs have increased as much as 6 times, with better work.

PORTABLE MOLD DRIERS

• These efficient units are supplied with wheels or for handling by cranes or trucks. They are complete airheat units, easy to handle and produce results comparable in uniformity of work to mold and core ovens.

HEAT TREATING FURNACES

• Maehler recirculating airheat ovens and furnaces for normalizing, annealing, tempering, bluing, aging, stress relieving, drawing, etc., are highly successful in producing uniform work at a high output.

FOR FASTER WORK — UNIFORM HEAT—LOWER COSTS—MORE OUTPUT PER SQ. FT.

The Paul Maehler Company

2200 W. Lake St., Chicago, Ill.

STYLE as well as SAFETY for Women Welders

HAT CREATED BY JOHN FREDERICS ... CLOTHING CUT FROM DRESSMAKER PATTERNS

AO Tailored Sleeves and Tailored Overalls. Also available: Tailored Cape Sleeves and Bib, and Tailored Aprons.

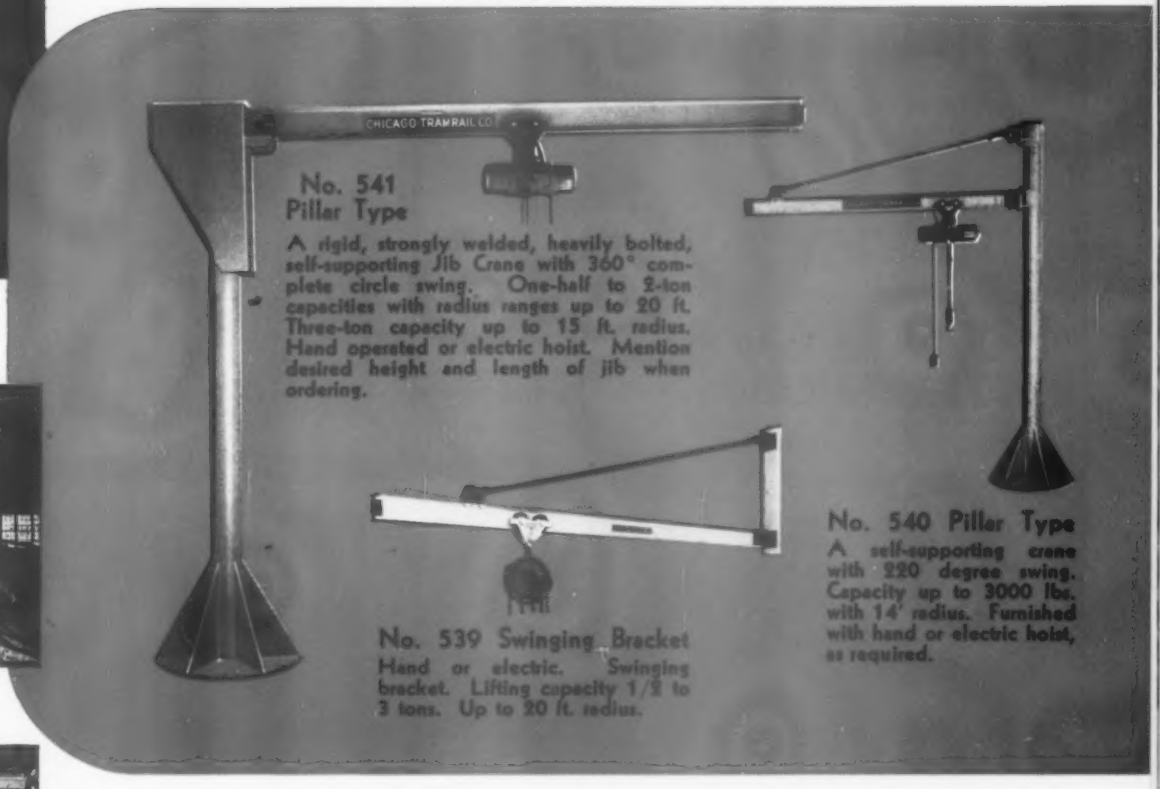
AO Tailored Coat. Also available: Tailored Short Jackets and Gloves and Mittens.

Follow the line of least resistance — the AO line of tailored protective clothing for women welders. Every garment is made of specially selected chrome tanned cowhide, tailored to provide comfort, flexibility, and freedom of movement. The leather is as light in weight as is consistent with safety—available in rich brown or natural gray.

John Frederics designed the hat — a jaunty creation that holds the hair snugly in place and protects hair and ears from flying sparks — available in rich brown or natural gray leather, or cassimere. Get in touch with your nearest American Optical Company branch for complete details.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

You wouldn't use a crane to change a tire...!



No. 541 Pillar Type
A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist. Mention desired height and length of jib when ordering.

No. 540 Pillar Type
A self-supporting crane with 220 degree swing. Capacity up to 3000 lbs. with 14' radius. Furnished with hand or electric hoist, as required.

No. 539 Swinging Bracket
Hand or electric. Swinging bracket. Lifting capacity 1/2 to 3 tons. Up to 20 ft. radius.

FURNACE CRANE

MOLDING FLOOR

LEANING ROOM

You'd never think of using a heavy lift device to change a tire. By the same token, you wouldn't find it practical to tie-up a heavy-duty overhead crane at *lighter-duty* points of foundry operation. Especially, when the heavy-duty crane can hand the load to these fast operating "little giants" of power—the Jib Cranes illustrated—thereby releasing your overhead equipment for bigger jobs. A "natural" spot for such a Jib Crane application is at the shake-out. There are many more.

As manufacturers of a wide range of cranes and hoists, we possess a practical working knowledge of modern foundry requirements and are therefore qualified to make such recommendations. Particularly, when the suggested use of Jib Cranes represents the successful experience of many of your fellow foundry operators.

Chicago Tramrail Jib Cranes are gluttons for work. They speed up point-of-operation production, conserve man-power, reduce wear and tear on more costly equipment. They're built for long, strenuous service. Rigid, strongly bolted, self-supporting. Free rotary swing. Hand operated or electric. Lifting capacities up to 3 tons.

These Jib Cranes, creating lower production costs and faster production schedules, merit your immediate attention. Illustrated circulars describing this new line will be sent upon request. Write today.

CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVENUE Phone KEDzie 7475 **CHICAGO, ILLINOIS**

RANSOHOFF

automatic Star-return

TUMBLING MILLS

speedy . . gentle . .
stars handled automatically throughout

QUICKER AND BETTER TUMBLING

and still you

SAVE . . .

as much as 66⅔% in time with proportionate savings in labor and plant costs.

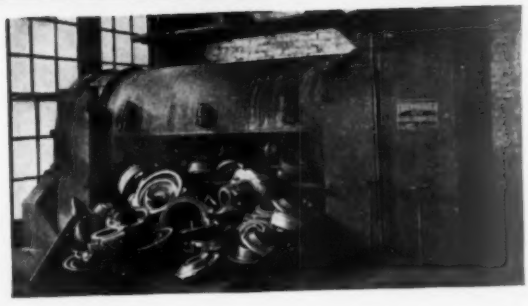
Here's the "How and Why"

THE RANSOHOFF METHOD:

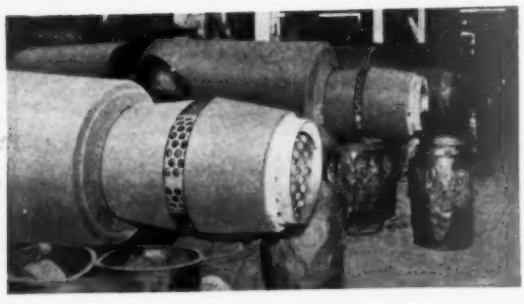
Castings cascade in a mass in which stars are intermingled thoroughly. All voids are filled completely. Stars vary in size and shape. Results: Very rapid cleaning without nicking, breaking or excessive wear on mill lining. Stars enter and return automatically. Replacement costs are at a minimum. Wet method eliminates dust and dust collectors, reducing health hazards.

N. RANSOHOFF Inc.
Township & Big 4 RR
CINCINNATI, O

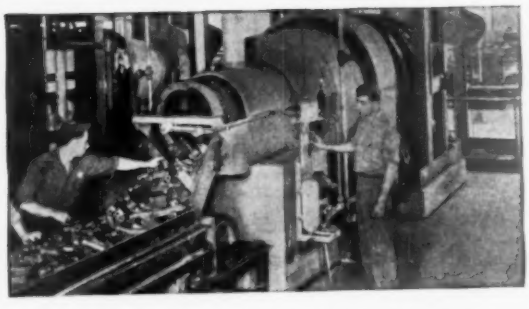
Side-loading, side-unloading wet mill. A hot solution is pumped through the mill while tumbling; clear rinse solution pumped through while stars are returning. Castings discharged on chute to sorting table.



Tumbling piston rings castings after molding and before machining, about 20 minutes per batch. Additional screen for separating polywogs or risers. Same mill used also in production and job foundries.



End-loading, end-unloading mill. Castings cleaned twice; before sorting and grinding; after sorting and grinding, ready for plating. Discharges onto inspection conveyor table. Power loader in pit.



End-loading, end-unloading wet mill cleaning grey iron pipe fittings. Discharges directly onto sorting table. Power loaders below floor level for loading.

Side-loading, side-unloading wet mill cleaning brass pump castings. Cold water is pumped through mill. Tumbling material usually brass crucible droppings.

How we can help you meet your *Ferro-Alloy Requirements*

"Electromet" Ferro-Alloys and Metals for the Cast Iron Foundry

Added to the Cupola	*Result*
"EM" Silicon Briquets (round)	Deoxidize and aid machinability by graphitizing effect. Reduce chill in light sections. Permit easy control of silicon additions.
"EM" Chromium Briquets (hexagonal)	Increase hardness, wear resistance, corrosion resistance, and heat resistance. Promote greater density. Permit easy control of chromium additions.
"EM" Silico-Manganese Briquets (square)	Act as a scavenger. Harden iron when added in large quantities. Permit easy control of manganese additions.
Added to the Ladle	*Result*
85% Ferrosilicon 50% Ferrosilicon	Deoxidizes and aids machinability by graphitizing effect. Reduces chill in light sections. (85% grade used for large additions.)
Silicon-Zirconium	Deoxidizes and graphitizes, improving density of iron.
Ferromanganese-Silicon	Combines graphitizing influence of silicon with scavenging action of manganese.
Ferromanganese	Acts as scavenger. Hardens iron when added in large quantities.
Foundry Grade S.M. Ferrochrome	Increases hardness, wear resistance, corrosion resistance, and heat resistance. Promotes greater density.
Ferrovanadium	Refines grain (of value particularly in improving impact strength of hard irons).
"SMZ" Alloy	Converts normally hard iron into high-strength gray iron. Reduces chill. Improves strength and physical properties.

UNDER present conditions, perhaps you can't get all the ferro-alloys you want in the grades you are accustomed to using. If so, it may be necessary for you to modify your practice to use alloys that are available. You may be able to substitute available standard sizes and analyses for special grades. You may be able to use a different combination of deoxidizers to achieve the same result. Or perhaps you can change the composition of your iron to take advantage of alloys that are available, and still obtain equally good physical properties.

With the knowledge gained through 35 years' experience in the manufacture and use of ferro-alloys, we may be able to suggest what you can substitute and how you can change your practice to

get the results you want. Our metallurgists can give you practical, on-the-job help. Ask for this service to help meet your ferro-alloy requirements. No obligation is involved.

Electro Metallurgical Company
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.

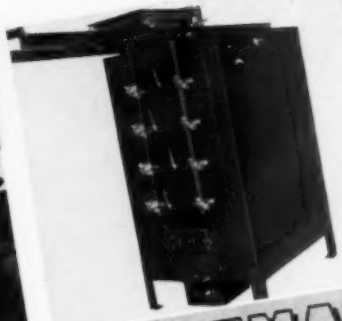
"Electromet" Ferro-Alloys and Metals are distributed through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

"Electromet," "EM," and "SMZ" are registered trade-marks of Electro Metallurgical Company.

Electromet
Trade Mark
Ferro-Alloys & Metals

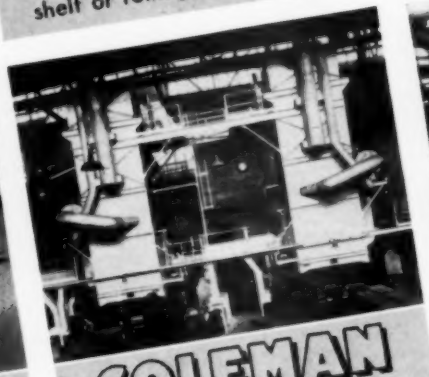
COLEMAN"

COLEMAN
ROLLING DRAWER OVENS
for speedy baking of small and medium cores.



COLEMAN
PORTABLE OVENS
for light production. Built in shelf or rolling drawer types.

COLEMAN
TRANSRACK OVENS
for operation with portable racks. Single or multiple rack capacity.



COLEMAN
TOWER OVENS
for high—speed production. ... Amazing savings in floor space and production costs.

COLEMAN
HORIZONTAL CORE OVENS
for large scale specialized core production.

37 Years' Experience in building all types and sizes!

COLEMAN
CAR TYPE OVENS
for both core baking and mold drying. No job too large.

COLEMAN
CONTINUOUS MOLD OVENS
for high speed drying of molds for production demands.

COLEMAN CORE AND MOLD OVENS

THE FOUNDR
BUILDERS OF COLEM
CLEVELAN

"Know-How" Gets Results—Speeds Production!

YOUR core-baking and mold-drying problems are quickly solved when you turn to Coleman Oven Engineers. Why not put the responsibility up to us—to give you faster, better and lower cost production in any class of foundry work?

Again we say "put your problems up to Coleman" and profit by "know-how" gained through over 37 years of specialization in the construction of more than 7,000 successful installations of all types and sizes for a great variety of foundry operating conditions.

Satisfaction is made doubly-sure by our complete guaranteed service with undivided responsibility from design to operation.

• If you are faced with a fuel problem, you can select Coleman Ovens for operation with whichever fuel is most easily available in your district.

Write for Folio of Bulletins.

COLEMAN
PORTABLE MOLD DRYERS
for drying interior of heavy molds.

World's Oldest and Largest Foundry Oven Specialists!

COLEMAN
CORE AND MOLD OVENS

QUIPMENT CO.
SWARTWOUT OVENS
IO, U.S.A.

WHEELS for *TOOL* and *CUTTER* and *SURFACING* jobs—any size, shape, grit, porosity or grade hardness! Whatever your requirements may be BAY STATE will serve you well. Send in your problems. We can help you.

BAY STATE

ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

Increased War Production

In most foundries with outstanding war production records, a continuous supply of properly conditioned sand is provided the molders by Royer Sand Separators and Blenders. There is a Royer model for every foundry requirement. Three of the eight Royers are shown.

Royer "NC-4" for small to medium sized jobbing foundries, and as an auxiliary unit for side floors in production foundries. Also used for preparing core sand. Has a capacity of 450 to 550 lbs. of sand per minute.

Royer "D" and "R" (specials) for use in sand systems where the drive is taken from the conveyor head or other drive shaft. They have contributed substantially to the efficiency and economy of sand systems. Placed ahead of the storage bin, they assure thoroughly tempered and open sand. Model "D" has a capacity of 24 to 30 tons per hour, and Model "R" 40 to 50 tons per hour.

The Royer Combination Scrap Remover and Sand Separator and Blender removes scrap, gaggers and burned cores from the used sand, and then does a thorough conditioning and blending job, including moisture distribution and double aeration. This complete portable or stationary unit requires no pits or foundations.

NOTICE—Royer equipment is sold only by experienced, factory-trained engineers who are qualified to advise you on the type of unit best suited to your conditions, and for maximum production. Our representatives have sold Royers for years, and each has satisfactorily serviced hundreds of foundries.

THE ROYER

ROYER FOUNDRY & MACHINE CO. *KINGSTON, PA.*

Flat....

AS A TABLETOP

STEEL

PATTERN PLATES
CORE PLATES
BOTTOM PLATES

All of our Flattened Steel pattern plates, core plates and bottom plates are processed to a straight-edge without machining the surface.

The result is a level plate as flat as a tabletop that will hold its shape for years.

Our plates are uniform in thickness, will stand hard usage, and will not buckle, warp or distort. Your inquiries will be given attention promptly.

MOLTRUP

MOLTRUP STEEL PRODUCTS COMPANY · BEAVER FALLS, PA.
(PITTSBURGH DISTRICT)

Mabco

WELCOMES YOU
to the
ST. LOUIS
A. F. A.

FOUNDRY WAR PRODUCTION CONGRESS

April 28-29-30

OUR entire organization will be at your service to make your trip to St. Louis pleasant as well as profitable. This significant program means a lot to all of us, and this means you — so — plan to attend.

M. A. BELL CO.

MABCO PRODUCTS—FOUNDRY SUPPLIES

St. Louis, Missouri

SUPPLIERS TO THE GREAT SOUTHWEST

KINDT-COLLINS

Announces

TWO NEW *Master Products*

★

MASTER Pat-Kote

Protective Pattern Coating

It's ready to use! It's a better, more durable, more dependable wood pattern and corebox coating than you have ever used before!

MASTER Pat-Kote is made to meet modern pattern shop needs. It has been proved in exhaustive laboratory and shop tests, and will give you such fine, efficient results that you never will go back to old-time materials.

MASTER Pat-Kote is easily applied—there is nothing tricky about its use. It produces a tough heavy-duty finish that truly protects. Has a high softening point when dry—will not stick in warm sand. Can be thinned with proprietary alcohols such as Ponsolve, Shellacol, Solox, etc.

MASTER Pat-Kote is furnished in Clear, Black, Chrome Yellow and Vermilion, in unit packages containing 1, 2 or 4 gallons.

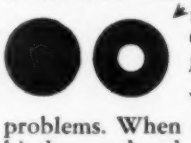
★

MASTER Core Vent Wax

Scientifically Formulated

MASTER Core Vent Wax is tailor-made to meet specific and individual needs—for magnesium, ferrous and non-ferrous casting. *We have a special formula for magnesium core work!*

MASTER Core Vent Wax assures you specialized formulas that give maximum results with various core binders, metals and sands. It eliminates blows, reduces scrap, and will step up your profitable output. It is free-flowing, and guaranteed not to affect permeability of the core. Can be furnished hollow or solid, in various shapes and sizes. *Only one grade is necessary for summer and winter use!*



We invite your core-vent problems. When writing, specify type of core binder, sand and metal used. We can help you!

THE KINDT-COLLINS COMPANY

12653 ELMWOOD AVENUE • CLEVELAND, OHIO

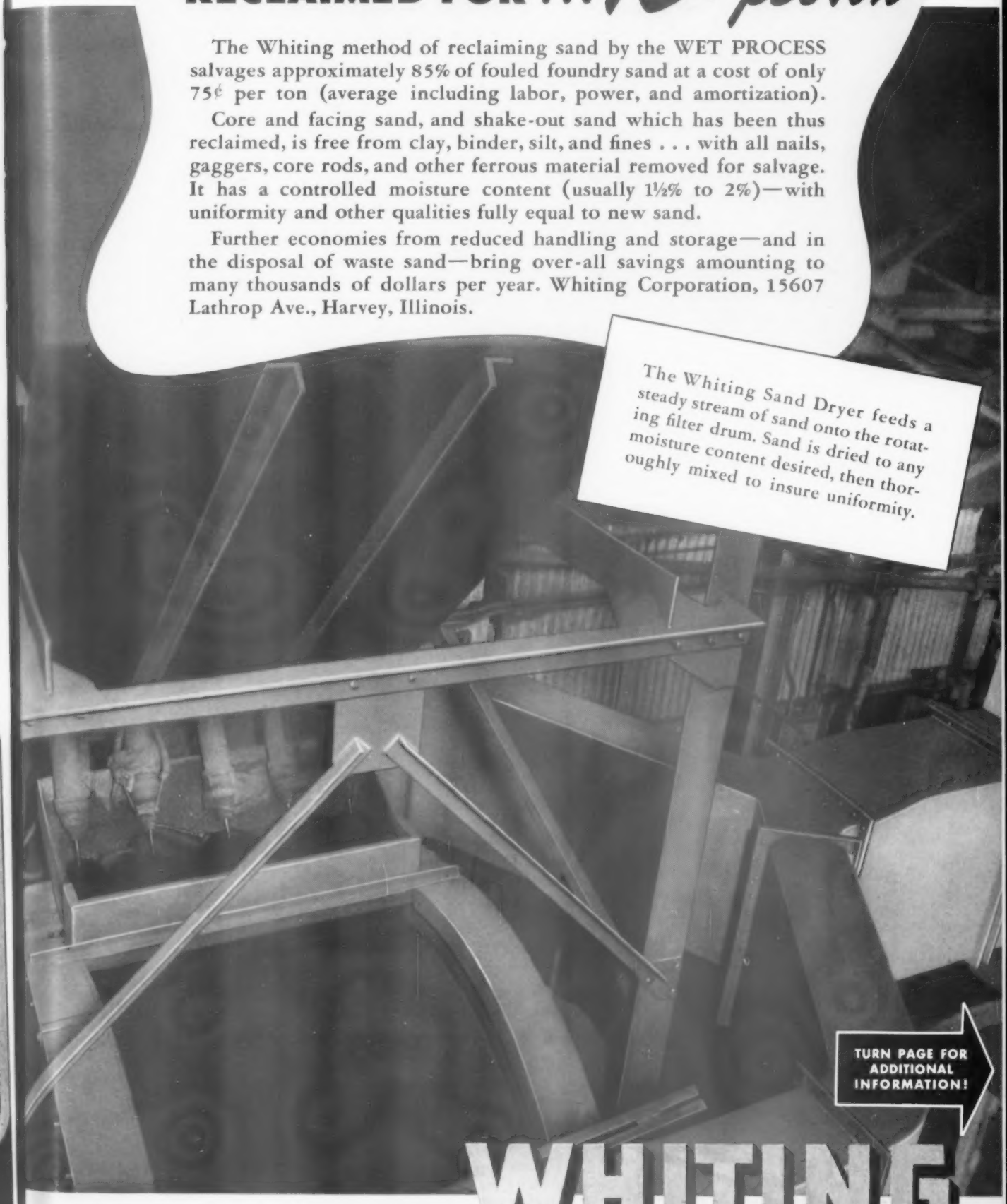
"EVERYTHING FOR THE PATTERN SHOP"

FOUNDRY SAND RECLAIMED FOR ... 75¢ per Ton

The Whiting method of reclaiming sand by the WET PROCESS salvages approximately 85% of fouled foundry sand at a cost of only 75¢ per ton (average including labor, power, and amortization).

Core and facing sand, and shake-out sand which has been thus reclaimed, is free from clay, binder, silt, and fines . . . with all nails, gaggers, core rods, and other ferrous material removed for salvage. It has a controlled moisture content (usually 1½% to 2%)—with uniformity and other qualities fully equal to new sand.

Further economies from reduced handling and storage—and in the disposal of waste sand—bring over-all savings amounting to many thousands of dollars per year. Whiting Corporation, 15607 Lathrop Ave., Harvey, Illinois.



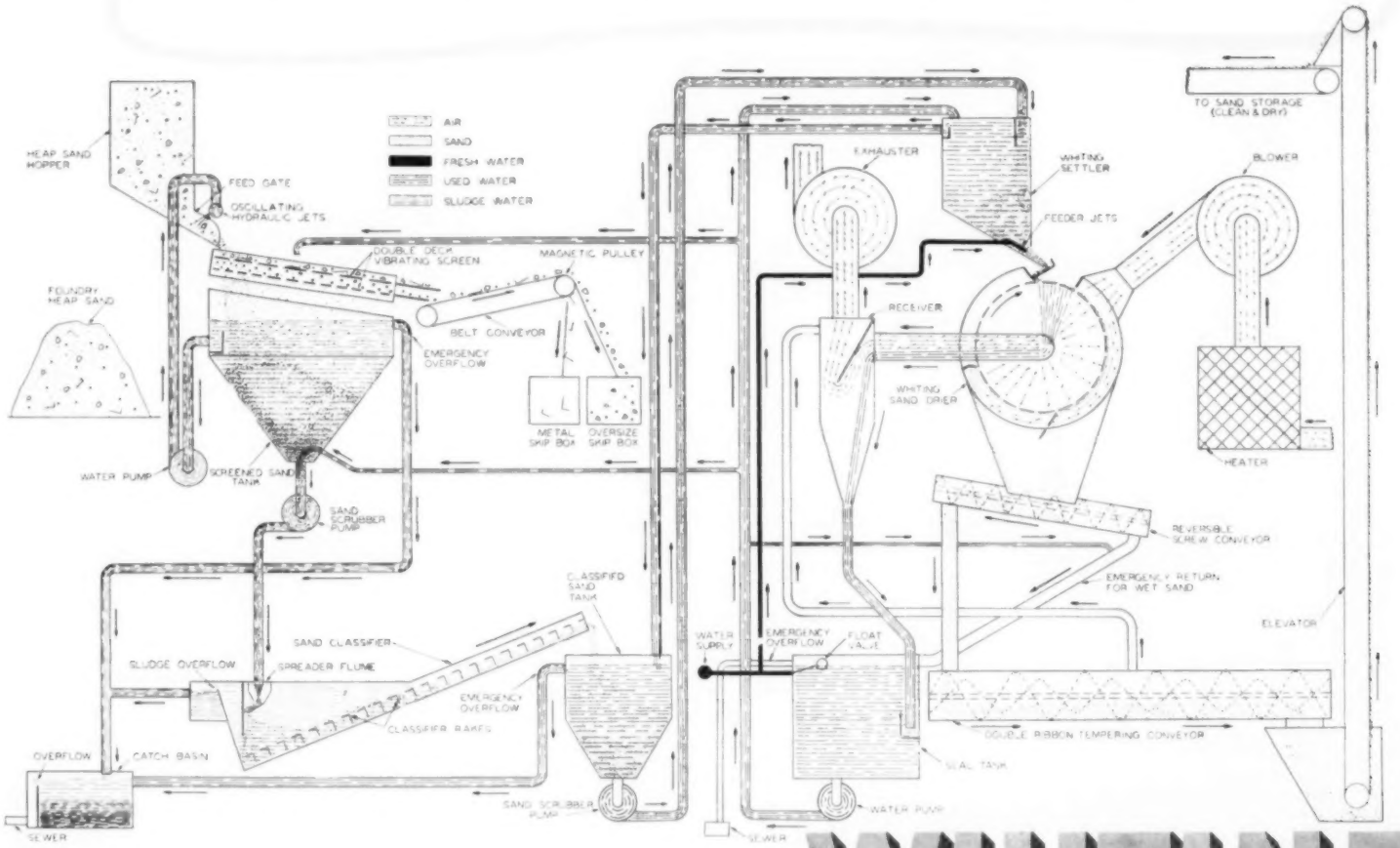
The Whiting Sand Dryer feeds a steady stream of sand onto the rotating filter drum. Sand is dried to any moisture content desired, then thoroughly mixed to insure uniformity.

TURN PAGE FOR ADDITIONAL INFORMATION!

WHITING
CORPORATION
PIONEERS SINCE 1884

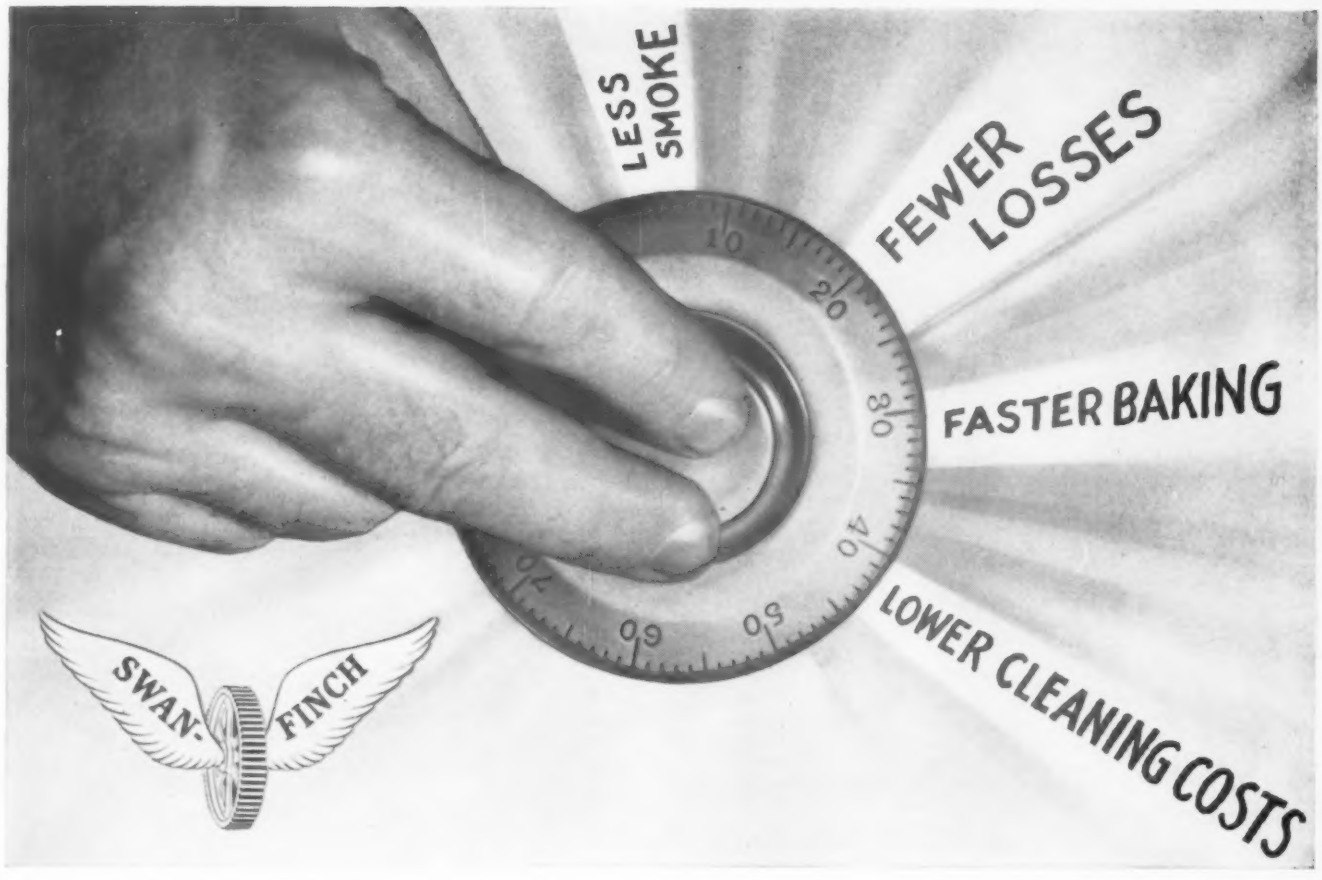
HOW THE *Whiting Sand Reclamation Unit* OPERATES

This is a WET PROCESS that removes clay and binder, as well as fines, without raising objectionable dust. It may be used whether castings are cleaned by a wet or a dry process. Each Whiting Sand Reclamation Unit is "tailor-made" to individual requirements . . . this installation is typical and shows how the Whiting Wet Process operates.



WHITING
CORPORATION

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, Washington, D. C.
Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto and Montreal.



SAFCO CORE OILS

Right Combinations for increased production!

Right combinations of ingredients in core oil are like the right numbers on the dial of a safe, each one vital for opening wide the doors of production.

SWAN-FINCH 'SAFCO' core oils are combinations that have been continuously proved as scientifically correct.

Today high production schedules do not permit guesswork;—lost time in baking, cleaning castings, cleaning core boxes or through core and casting losses.

SWAN-FINCH, the makers of 'SAFCO' core oil have been specialists in core oils for over 30 years.

That's why more important foundries engaged in vital war production are testing and specifying 'SAFCO' core oils.

It will pay you real dividends to get better acquainted with the Swan-Finch field representative who covers your district. Capable and able, they are constantly devising *new* ways and means for stepping up production.

For instance meet "Gene" Morris. He is one of our highly trained and experienced staff of fieldmen.

ASK US TO HAVE HIM CALL — NO OBLIGATION.

SWAN-FINCH OIL CORPORATION

Offices		Plants	
New York City—Executive Offices	R.C.A. Building, West	Newark, N. J.	120 Lister Avenue
Chicago, Ill.	201 North Wells Street	Chicago, Ill.	5849 West 66th Street (Clearing, Ill.)
Detroit, Mich.	2596 Hart Avenue	Detroit, Mich.	2596 Hart Avenue

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, Washington, D. C.
Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto and Montreal.

Come to "MAGNETIC HEADQUARTERS"

Dings High Intensity Lifting Magnet handling five 2,000 lb. castings.

FOR FASTER, MORE EFFICIENT HANDLING OF THESE JOBS:

Separation of Ferrous and Non-Ferrous Scrap—Dings builds a complete line of magnetic pulleys, pulley type separators, drum type separators and agitating type separators for handling *all* classes of scrap.

Conditioning Foundry Sand—Pulleys, pulley type separators and drums to remove all iron. Sand, hot from the shakeout floor, can be handled on Dings equipment designed to withstand high temperatures.

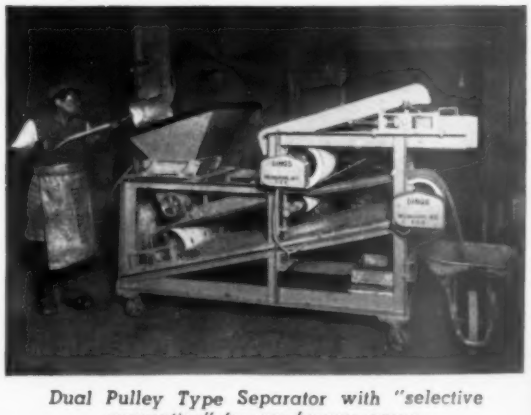
Reclaiming Iron from Slag—An efficient, high capacity output can be secured with Dings equipment.

Handling Metal—Scrap, castings, plates, metal flasks, pipe, etc., can be handled faster and easier with Dings Lifting Magnets.

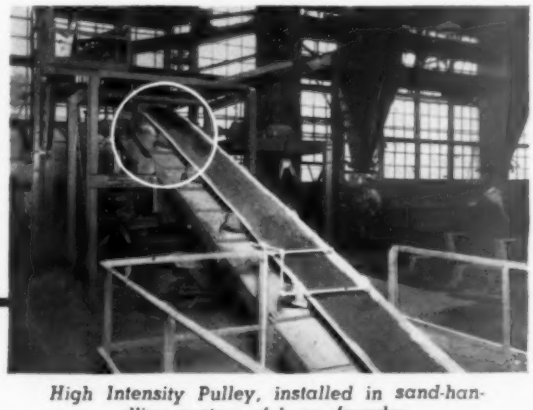
Submit your separation jobs to Magnetic Headquarters for recommendations based on thousands of installations.

Write for literature today

Pulley Type Separator for removing iron from foundry sand.



Dual Pulley Type Separator with "selective separation" for non-ferrous scrap.



High Intensity Pulley, installed in sand-handling system of large foundry.

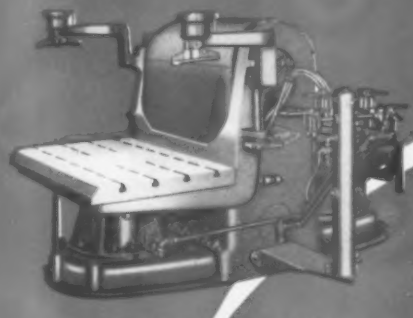
DINGS MAGNETIC SEPARATOR CO.
512 East Smith Street • Milwaukee, Wisconsin
World's Largest Exclusive Builder of Magnetic Equipment

Dings MAGNETIC SEPARATION HIGH INTENSITY

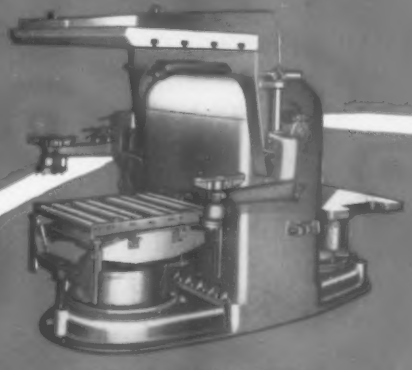
"DAVENPORT"

MODERN MOLDING MACHINES

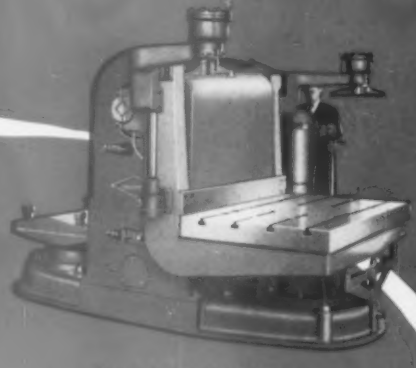
in war prepare for peace



Rollover, Model A, 28-34

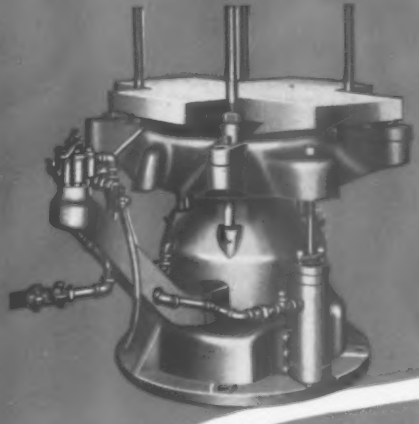


Rollover, Model A, 28-34



Rollover, Model A, 40-48

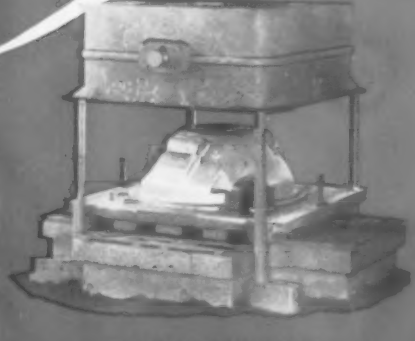
Pin Lift, Model AJS, 24-28



Pin Lift, Model AJS, 24-28

Pin Lift, Model AJS, 34-40

Pin Lift (portable), Model AJS, 24



Pin Lift, Model AJS, 24-28

TODAY IN WAR

is the toughest test in history for American foundries. Production is geared to win. Your equipment should be at its highest efficiency.

TOMORROW IN PEACE

will continue to be a tough test for all foundries. World competition will demand efficiency.

IT WILL PAY YOU TO CHECK

your present molding machine equipment. See that your foundry will meet these two great periods in American industry.

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DAVENPORT MACHINE & FOUNDRY COMPANY

Davenport **Iowa, U. S. A.**

DAVENPORT

VENPORT MACHINE & FOUNDRY CO., U. S. A.

IDEAL FOR ALL *Pattern Plates and Flasks*

HINES

HARDENED, GROUND, CHROME PLATED PINS AND BUSHINGS . . . .

Require no Lubricants

WILL NOT RUST
WILL NOT STICK
(Tolerance .002")

Made in all standard sizes which are carried in stock for prompt shipment.

Bushings are made in two lengths for heavy and light pattern plates.

MAKERS OF FOUNDRY FLASKS AND JACKETS Since 1919

Write for folder giving sizes and other data and information.

HINES FLASK COMPANY
Phone ACademy 1480
1324 HIRD AVENUE • CLEVELAND, OHIO

— the experience accumulated by Fisher Engineers thru 35 years of furnace designing and building, and melting room layout engineering—in every branch of non-ferrous metal melting—will sum up as an invaluable combination in both modernization and expansion programs. It paves the way to greater operating flexibility and greater profit, thru coordination of equipment to plant and production conditions. Learn about this engineering service, without obligation, and receive illustrated, descriptive engineering data on the complete line of Fisher Crucible Melting Furnaces (stationary—hand wheel operated, tilting types, and motorized units), Iron Pot Melting Furnaces, Centrifugal Blowers, Combination Blowers and Oil Pump Systems, Karmix Cement, Silicon Carbide Linings, etc.

FISHER FURNACE COMPANY
5519 N. Wolcott Ave. Chicago, Illinois

LITERATURE on any of these units sent on request.

FISHER MOTORIZED NOSE POUR CRUCIBLE
Oil or gas fired. No. 150 to No. 400 crucible capacity. (450 to 1200 lbs. in red brass or 150 to 400 lbs. in aluminum).

FISHER B. B. I. HAND OPERATED CRUCIBLE
Oil or gas fired. No. 150 to No. 400 crucible capacity. (450 to 1200 lbs. in red brass or 150 to 400 lbs. in aluminum).

FISHER TYPE "S" STATIONARY CRUCIBLE MELTING FURNACE
Oil or gas fired. No. 20 to No. 250 crucible capacity. (60 to 750 lbs. in red brass or 20 to 250 lbs. in aluminum).

FISHER COMBINATION BLOWER AND OIL PUMP UNIT
Oil and air requirements delivered by same motor. Full range in combination sizes.

SILICA SANDS

Washed . . . Dried . . . Crude

MOLDING
CORE
FURNACE BOTTOM
SANDBLAST
(5 GRADES)

SILICA GRAVEL
SILICRETE
A graded quartz aggregate for concrete floor finishes and acid-proof asphalt floors.

INDUSTRIAL SILICA CORPORATION

Stambaugh Bldg., Youngstown, Ohio

Plants

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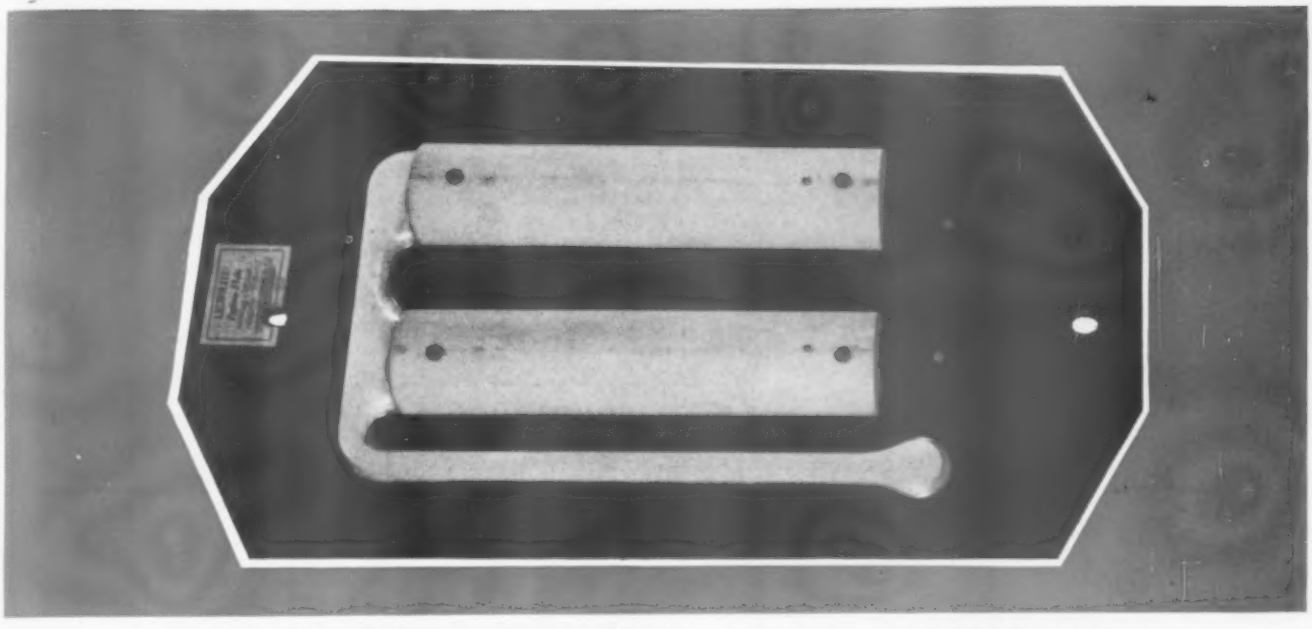
Phalanx, Ohio	Dundee, Ohio	Geauga Lake, Ohio	Utica, Pa.

LIGNOLITE



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2812 Center Street, Houston, Texas
M. A. BELL COMPANY
217 Lombard Street, St. Louis, Missouri
COMBINED SUPPLY & EQUIPMENT CO., INC.
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WATERSTON'S
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Non-Critical, Immediate Shipment

AN EXTREMELY TOUGH LIGNIN PLASTIC

- Half the weight of aluminum.
- Easily machined, sawed, drilled, tapped, etc.
- Impervious to moisture, oil, grease, dilute acids.
- Uniform caliper and non-warping.
- Abrasion proof and non-slip surface.

Unlimited Supply . . . Low Cost

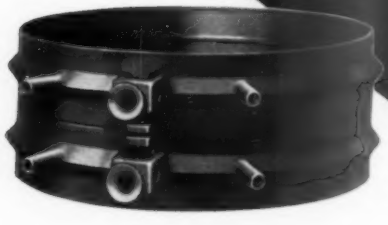
STANDARD SIZES — HOW TO ORDER

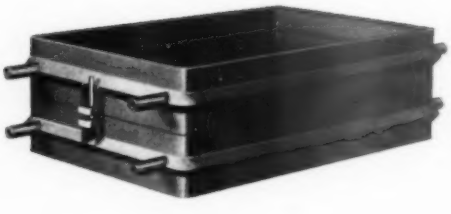
Available in all flask sizes, 3/8" to 2" thick. Plates are octagonal in shape with 1" allowance for flask and 2½" allowance for ears. Sheets are also available for own cutting. Sizes are 46" x 46" for thicknesses from 3/8" to 5/8" inclusive; 40" x 40" for thicknesses over 5/8". Please write for sample and complete information.

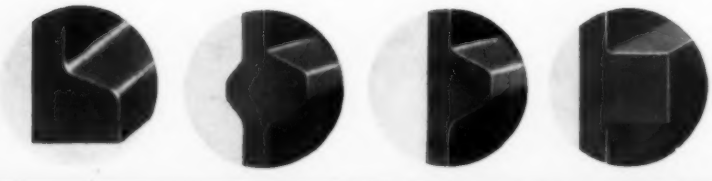
MARATHON CHEMICAL COMPANY
DIVISION OF MARATHON PAPER MILLS COMPANY
ROTHSCHILD WISCONSIN

Sentenced for LIFE!

Every Sterling Flask that leaves our factory is sentenced for life, at hard labor. And, inherently, it has the ruggedness and strength to carry out the sentence. Solid construction, all-welded, rolled steel, with reinforcing ribs and square flanges, full-width bearing and other substantial features, make Sterlings dependable LIFE-TIME foundry flasks . . . flasks that retain rigidity and accuracy even under tough 3-shift production schedules. That's why Sterlings are the preferred flasks in more than 3500 American foundries.







Note the solid center reinforcing rib, square flanges and full-width bearing. They assure accuracy and speed in molding . . . make it easy to ram, easy to shake out. (Patent No. 1974292)

Sterling FOUNDRY FLASKS

Flasks available in all styles and shapes . . . all-welded, special rolled steel sections . . . strong but light, for speed and endurance.

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

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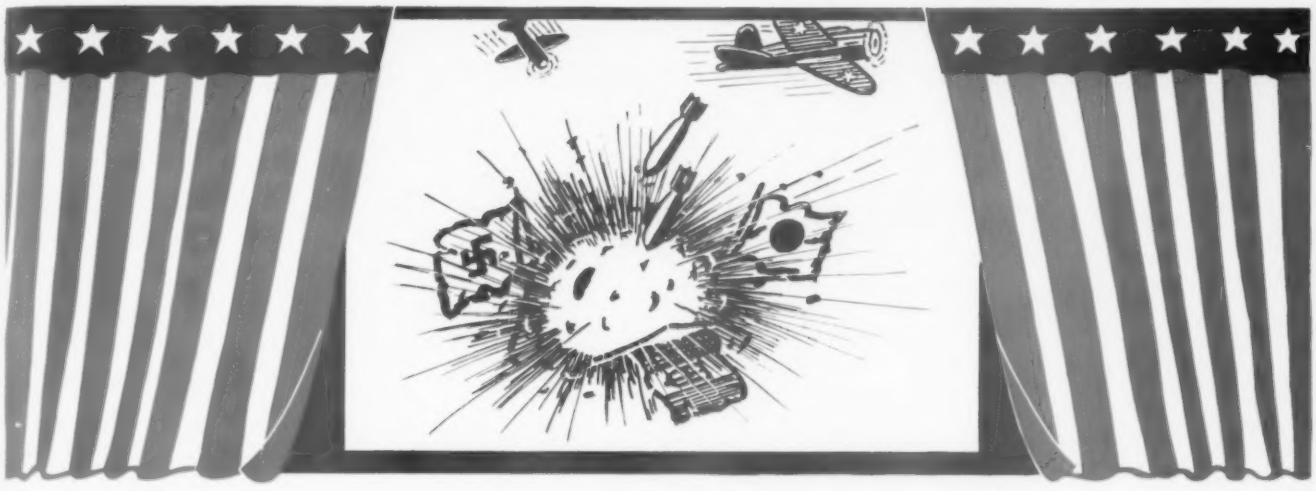
Make it...
CURTAINS FOR THE AXIS



Help to speed up deliveries to the fighting front...

with CARL-MAYER CORE *and* MOLD *Ovens*

Our fighting forces are unmatched, yet they must have an abundance of equipment and supplies to win an early victory. Improved foundry ovens, created by Carl-Mayer, will help!

CARL-MAYER LEADERSHIP in speed, efficiency and fuel economy has been verified by repeat orders from concerns of national prominence.

Call for a Carl-Mayer Engineer or Bulletin 241.

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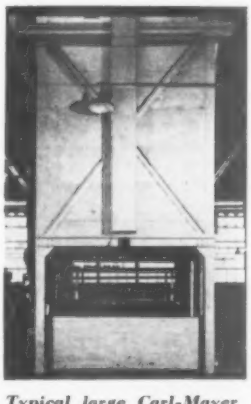
Cleveland, Ohio



Typical large Carl-Mayer Vertical Core Ovens as installed at outstanding foundries.

Carl-Mayer Monorail Type Continuous Conveyor Core Oven. Installations at Ford, Packard and other leading plants.

All Types **CARL-MAYER CORE AND MOLD OVENS** *All Sizes*

SERVING CONCERNS LIKE *these:*

Aluminum Co. of America
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Ford Motor Co.
Fort Pitt Steel Casting Co.
Frank Foundries Corp.
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General Motors Corp.
General Electric Co.
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International Heater Co.
Packard Motor Co.
Shenango Penn Mold Co.
Studebaker Corp.
Whiten Machine Works
Whiting Corp.

DOWN-GRADING CHART FOR BRASS AND BRONZE CASTINGS SHOWING SPECIFICATIONS AND MATERIAL REQUIREMENTS

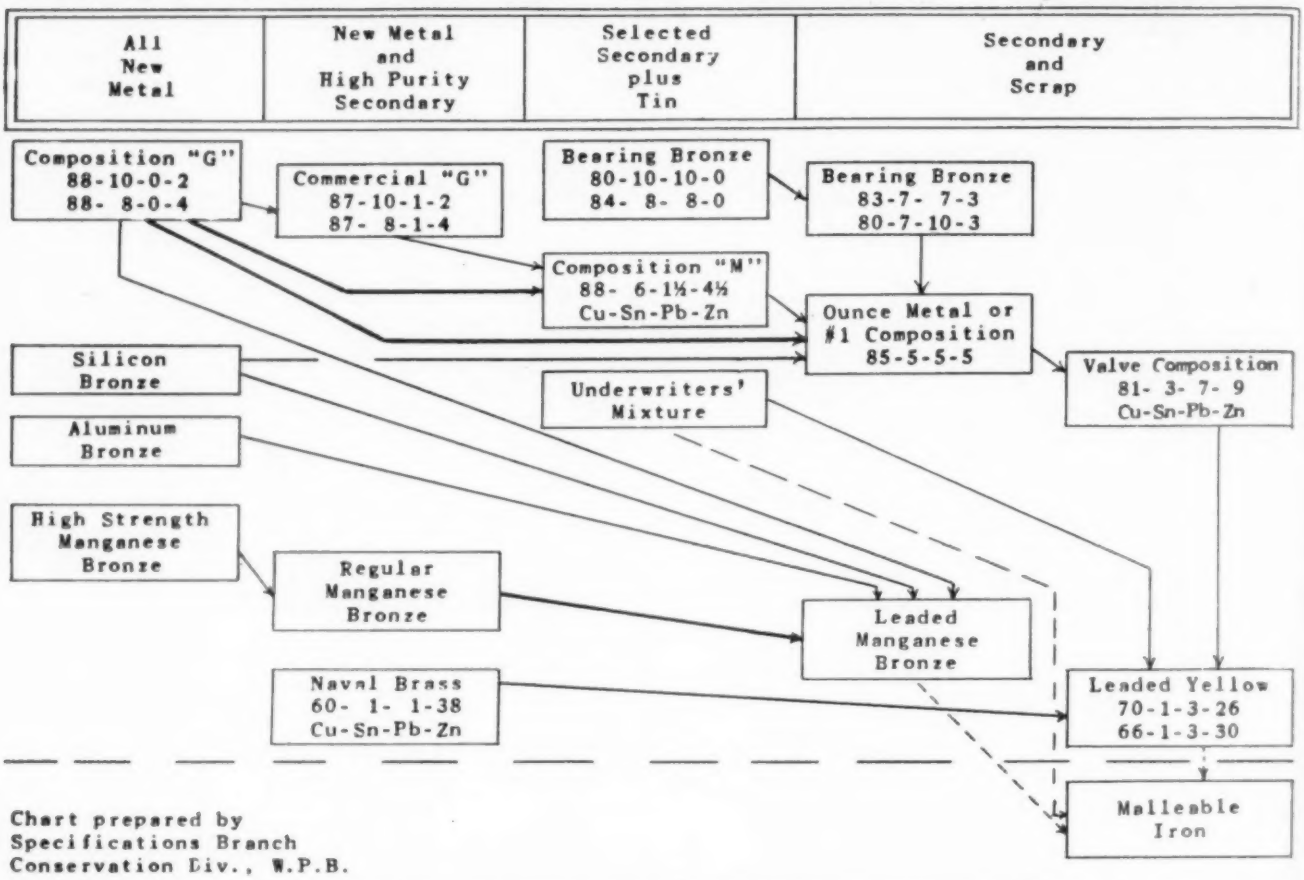

All New Metal
New Metal and High Purity Secondary
Selected Secondary plus Tin
Secondary and Scrap
Composition "G" 88-10-0-2 88- 8-0-4
Commercial "G" 87-10-1-2 87- 8-1-4
Bearing Bronze 80-10-10-0 84- 8- 8-0
Bearing Bronze 83-7- 7-3 80-7-10-3
Composition "M" 88- 6-1½-4½ Cu-Sn-Pb-Zn
Ounce Metal or #1 Composition 85-5-5-5
Valve Composition 81- 3- 7- 9 Cu-Sn-Pb-Zn
Silicon Bronze
Underwriters' Mixture
Aluminum Bronze
High Strength Manganese Bronze
Regular Manganese Bronze
Leaded Manganese Bronze
Naval Brass 60- 1- 1-38 Cu-Sn-Pb-Zn
Leaded Yellow 70-1-3-26 66-1-3-30
Malleable Iron

Chart prepared by
Specifications Branch
Conservation Div., W.P.B.

SPECIFICATIONS					
ALLOY	ASTM	ARMY & FEDERAL	NAVY	AMS	SAE
Composition "G"	B 143, 1A & 1B B 60	QQ-B-691a - 5	46M 6g "G"	4845 A	62
Commercial "G"	B 143, 2B E-B 143, 2X	QQ-B-691a - 6	46B 5h "P-c"		
Composition "M"	B 143, 2A B 61	QQ-B-691a - 1	46B 8g "M"		
85-5-5-5	B 145, 4A B 62	QQ-B-691a - 2	46B23c "Oz-c"		40
81-3-7-9	B 145, 5A	QQ-B-691a -11	46B24d		
80-10-10	B 144, 3A			4842	64
84- 8- 8	E-B 144, 3Y	QQ-B-691a - 8	46B22d "II"		
83- 7- 7-3	B 144, 3B	E-QQ-B-691a - 8			660
80- 7-10-3	E-B 144, 3X				
Naval Brass	B 146, 6C	QQ-B-621 - A	46B10f "N-c"		
70- 1- 3-26	B 146, 6A E-B 146, 6X & 6Y	E-QQ-B-621 X & Y			
66- 1- 3-30	B 146, 6B	QQ-B-621 - B	46B11f		41
Silicon Bronze		QQ-C-593	46B28		
Aluminum Bronze	B 148, 9A & 9B	QQ-B-671a	46B18c		68
Underwriters' Mixture		WW-C-621a	34F 3c		
H. S. Manganese	B 147, 8B	QQ-B-726b B & C	46B29 "MA-c"	4862	
Regular Manganese	B 147, 8A	QQ-B-726b - A	49B 3e "Mn-c"	4860	43
Leaded Manganese	B 147, 7A	E-QQ-B-726b - A			

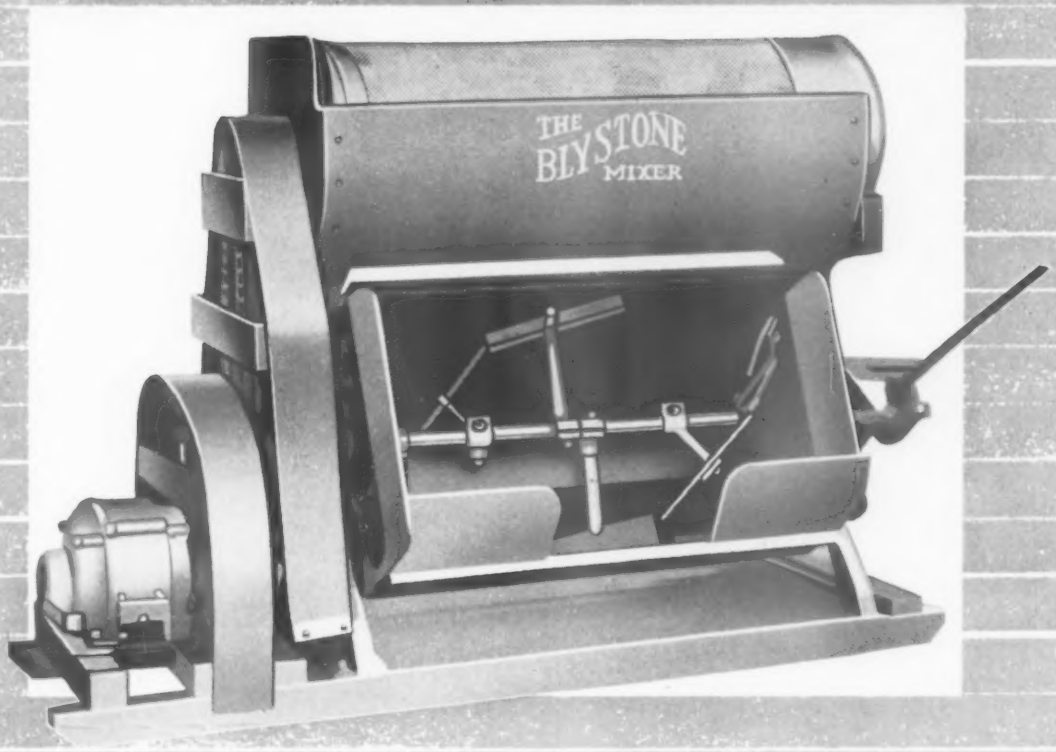
NOTE—Specifications, as shown, are approximately equivalent but may not in all cases be interchangeable for procurement and inspection.

For further information our research department will be glad to help you.

THE RIVER SMELTING & REFINING CO.

P. O. BOX 5755 CLEVELAND, OHIO FLORIDA 3040

BLYSTONE *Mixers*



THE PADDLE TYPE MIXER
for core sand mixing in the foundry

FOR over 30 years Blystone has pioneered in developing and manufacturing paddle type mixers for foundry core sand mixing. With your requirements in mind, Blystone has constantly improved its product with exclusive features that increase efficiency of operation.

The thoroughness of mix for which Blystone Mixers are noted is due to the Blystone Patented Reverse Spiral Shovel System. This system consists of a series of shovels that thrust materials to the right, catches them, and returns them to the left AT THE RATE OF 50 TIMES A MINUTE. It shovels, stirs and travels thoroughly, bringing out the full value of the oils or other binders, and assuring the correct porosity for cores that produce perfect castings.

In all Blystone Mixers the batch is always in view—tests can be made at any time without discharging—thus eliminating all guess work.

Blystone paddle-type mixers are the answer to your core sand mixing problems. There is a type and capacity to suit your particular requirements. A new Blystone folder will give you all the details on the mixer for your job. Write for it.

BLYSTONE *Advantages*

1. Low Mix Cost
2. Very Thorough Mix
3. Easy to Operate
4. Sturdily Constructed
5. Quick Repair Service
6. Low Initial Cost

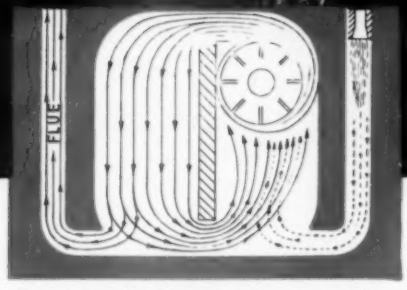
●

BLYSTONE DIVISION · · · *Standard Sand and Machine Co.*

549 W. Washington Blvd., Chicago, Ill.

A production row of Cyclones for precision tempering on a wide variety of work

HOW TO CONTROL YOUR TEMPER to ±1 Rockwell "C"



This is how the Cyclone heats your work with rapid uniformity.

And we mean it, both ways. You can relax the frown and be assured of meeting the toughest Army or Navy "specs" the day your Cyclone moves in.

The Cyclone Tempering Furnace employs 100% forced convection for rapid uniform heating of the work, with a temperature accuracy that enables you to control the temper of the hardest job, whether it is a dense load of ¼" washers or a 50 pound die. The reliability of this ruggedly built tempering furnace, with its laboratory accuracy, has been proved through its country-wide use on hundreds of 24 hour-a-day production lines. It's a leader and performs like one. In the days to come, the desirable economy and precision performance of the Cyclone will repeatedly indicate a wise choice.

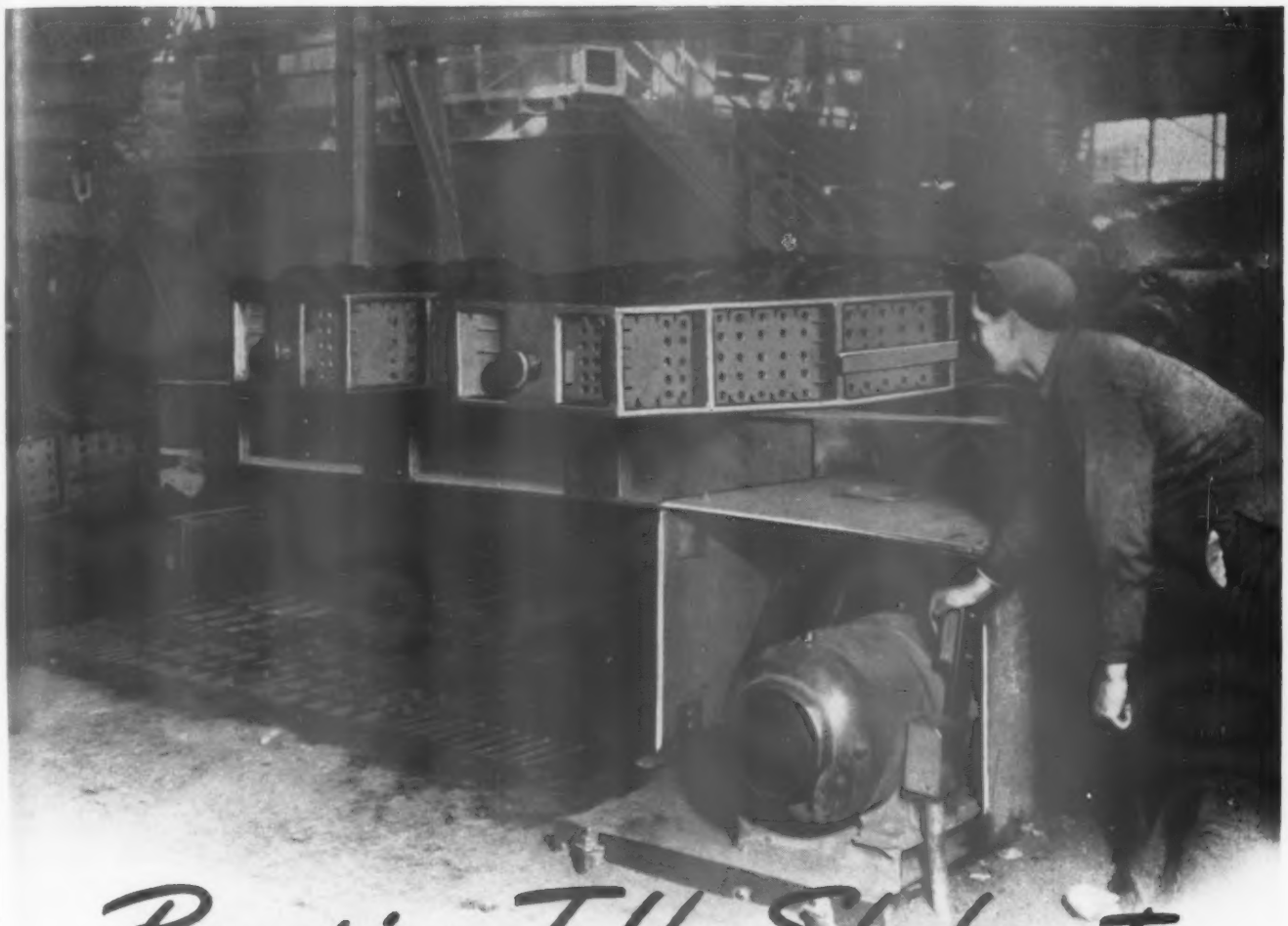
NO SECRETS WITHHELD — There is no secret about this weapon which is used for combating production jams, costly maintenance, delayed production and uncertain hardness readings. It is available in a wide range of sizes in vertical and box type designs, both fuel fired and electrically heated. But you can see pictures of all its features, and read about its advantages at your leisure . . . write today for Bulletin 53 on the gas fired Cyclone Furnace and Bulletin 13 on the electrically heated Cyclone.

LINDBERG ENGINEERING COMPANY
2453 West Hubbard Street • Chicago

LINDBERG FURNACES

ARMY (E) NAVY

SUPER-CYCLONE FOR HARDENING, NORMALIZING, ANNEALING, TEMPERING
CYCLONE FOR ACCURATE, LOW-COST TEMPERING AND NITRIDING
HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING



Bumping Table Shakeouts

in sizes for practically any flask

The Bumping Table Shakeout, a typical installation of which in a large steel foundry shaking out two 5000 lb. 10 ft. flasks as shown above—is an exceedingly efficient unit and can be furnished in sizes for handling large, medium and quite small flasks.

The tables of these units are mounted over collecting hoppers. One end of the table is hinged to a rigid support—the other rests on motor-driven cams that produce a thorough bumping effect.

In addition to Bumping Table Shakeouts, we are in a position to furnish shakeouts consisting of a perforated plate or heavy wire mesh screen mounted on a vibrating frame, vibrating bail and various special shakeouts—air operated mold pushers and pullers that simplify the moving of heavy flasks from mold conveyors to shakeouts,—and all required dust collecting hoods and duct work.

Our recently issued 40-page Foundry Bulletin No. 91 illustrates many different shakeouts and other Bartlett-Snow foundry equipment . . . Send for a copy!

THE C. O. BARTLETT & SNOW CO.

6201 HARVARD AVENUE • CLEVELAND, OHIO

Engineering and Sales Representatives in the Principal Cities

FOUNDRY SAND, MOLD AND CASTINGS HANDLING • • DUST AND FUME CONTROL SYSTEMS • •

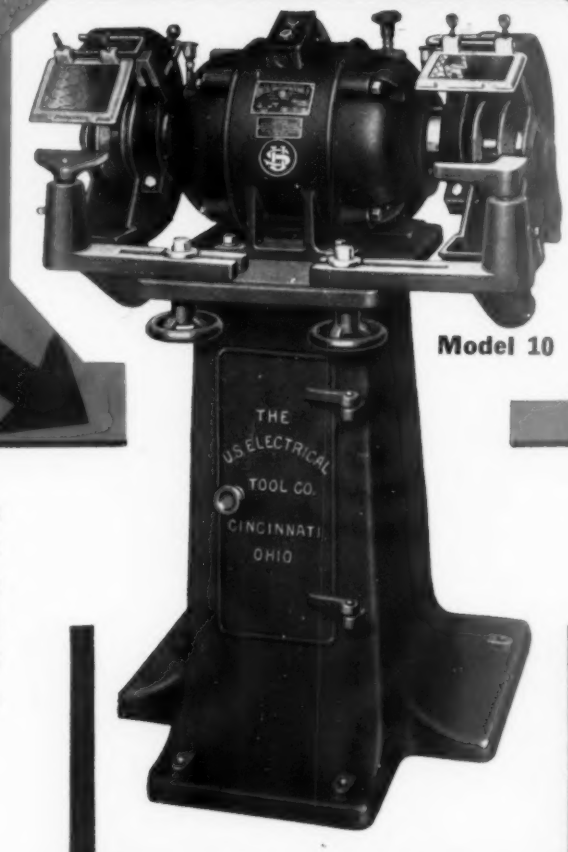
"THE GOOD MECHANIC'S CHOICE!"

WHEN IT COMES TO A

"SHOW-DOWN"

THIS GRINDER . . .

"SHOWS-UP" BEST!



Model 10

LIKE all other members of the United States Electrical Tool line, Model 10 puts on a wonderful show every day. . . in thousands of foundries it's busy as a bee grinding off burrs and protuberances, smoothing surfaces, ridges and rough spots. It's worth looking into . . . *reasonable deliveries, too.*

Model 10

HEAVY-DUTY FLOOR GRINDER

semi-steel wheel guards adjustable to wheel wear; for 12" to 20" wheels

heavy-duty ball bearings, heavy-duty motors, one-piece manganese alloy steel spindle with shaft locking device, pushbutton control with overload protection, semi-steel wheel guards, adjustable tool rests, eye shields, straight flanges, water pot.

HEAVY DUTY FLOOR GRINDERS

THE UNITED STATES ELECTRICAL TOOL CO.

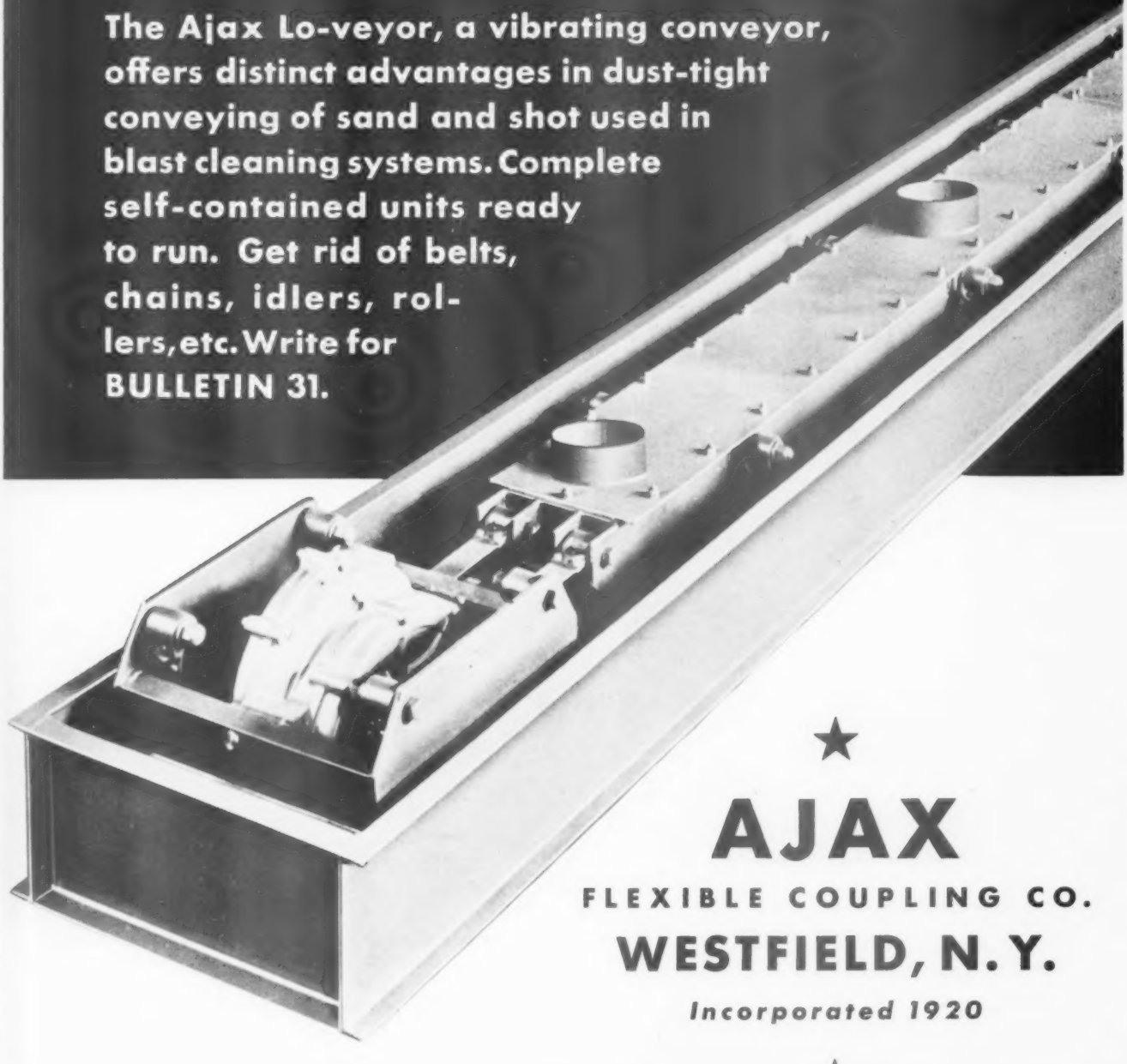
CINCINNATI, OHIO, U.S.A.

REPEAT ORDERS FROM PRODUCTION FOUNDRIES PROVE THAT

AJAX LO-VEYORS

are their own best Salesmen

The Ajax Lo-veyor, a vibrating conveyor, offers distinct advantages in dust-tight conveying of sand and shot used in blast cleaning systems. Complete self-contained units ready to run. Get rid of belts, chains, idlers, rollers, etc. Write for BULLETIN 31.



★

AJAX

FLEXIBLE COUPLING CO.

WESTFIELD, N.Y.

Incorporated 1920

★

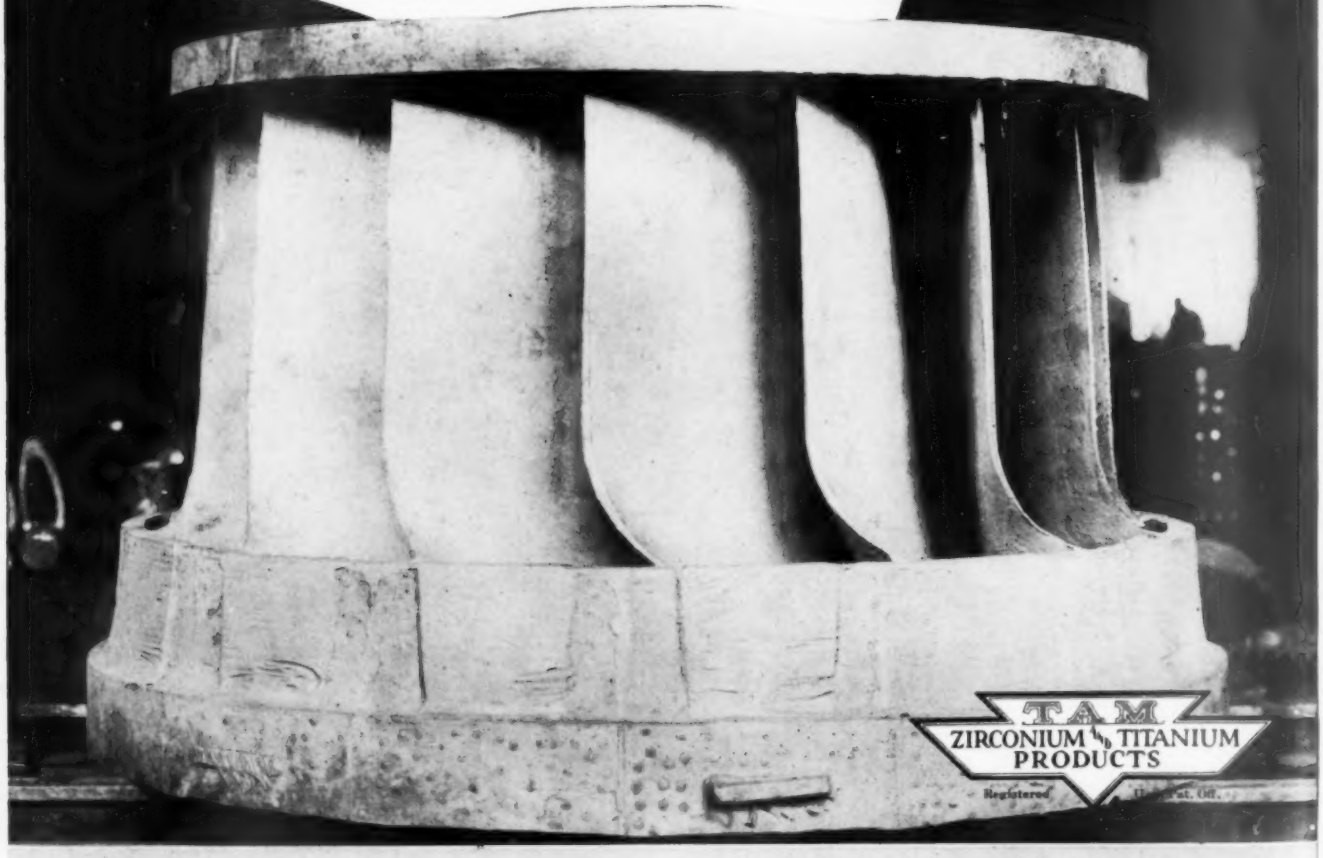
SMOOTH FACES FOR CASTINGS

TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

TITANIUM ALLOY MANUFACTURING COMPANY

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special interest is the fact that no nails were used in the facing.



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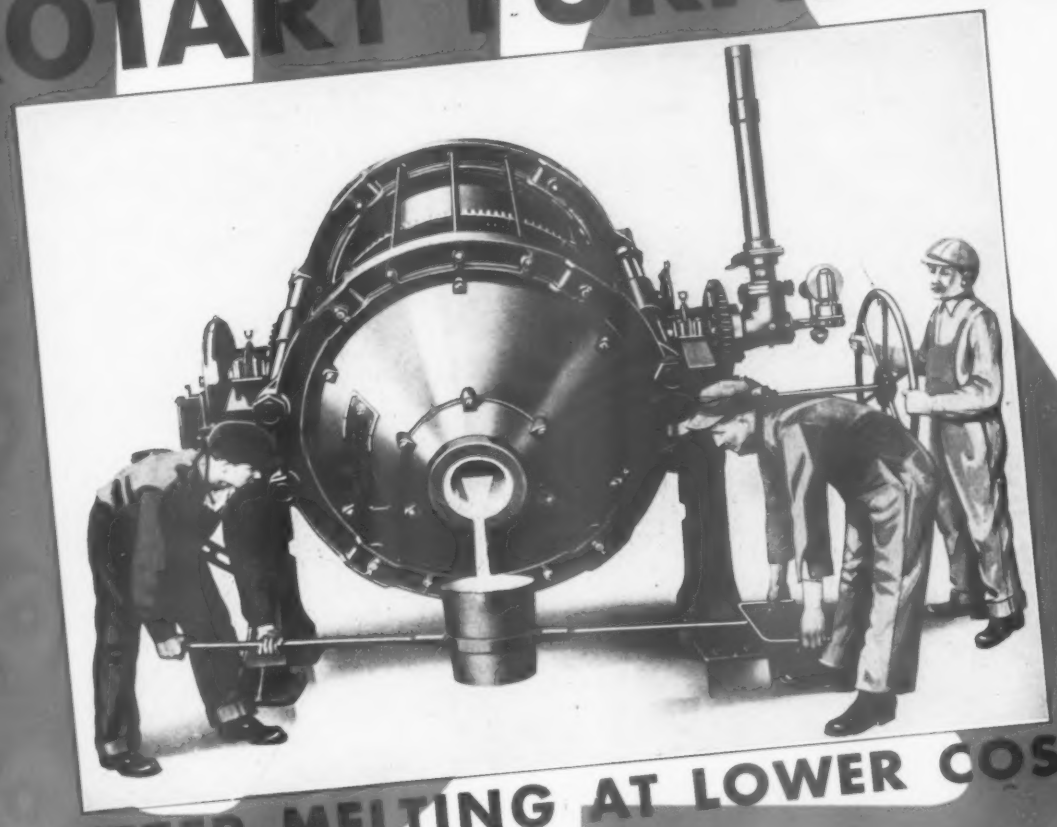
ROTARY FURNACES



BETTER MELTING AT LOWER COST

★ for NON-FERROUS Metal Melting

Compact, efficient, and low in cost, the U. S. Rotary-type Furnace gives remarkable performance in the melting of non-ferrous metals. Easy to operate, the secret of its efficiency lies in the rotating of the melting chamber—as the melt progresses, the charge is attacked equally from above and below with a high degree of clean, white heat which eliminates fusible impurities and throws the metallic impurities into the slag. Charges may consist of any form—ingot, turnings, grindings, borings, concentrates, metal-laden slag. Available in capacities from 150 lb. to 3000 lbs. (brass), 50 lb. to 1000 lbs. (aluminum).

★ for RECLAIMING

This type of furnace is also ideally suited to use for reclaiming non-ferrous secondary metals and accumulations such as brass turnings, borings, grindings, concentrates, sweepings, etc. Furnace can be equipped with extra feature for "bottom pouring" when desired.

Write for detailed folders OR have us get in touch with you at the A. F. A. Conference in St. Louis.

The U.S. SMELTING FURNACE CO.

Telephone-129

BELLEVILLE, ILLINOIS

(St. Louis Industrial District)

INGOT MOLDS

U. S. Sectional ingot mold stands are noted for the time, labor and money they save. They are "easy dumping," ruggedly built and are available in units of 8 or 10 molds.

LADLE HEATERS

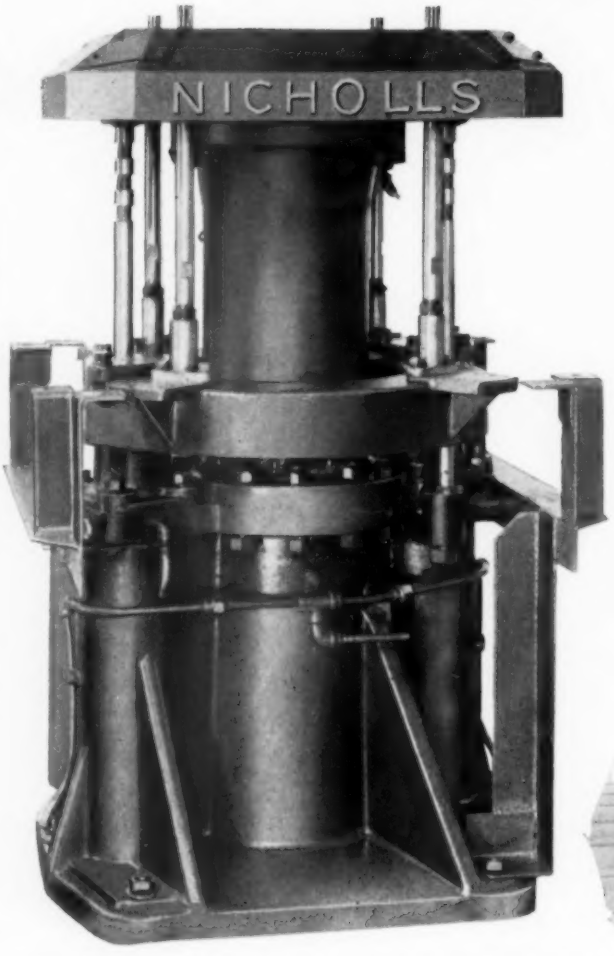
This compact, efficient unit heats a cold ladle in 8 to 10 minutes, melts out scum and skull in from 12 to 15 minutes. For either oil or gas fuel. Two sizes—No. 1 for ladles to 500 lb. cap; No. 2 for ladles to 2000 lb. cap.

MOLDING MACHINES

For Speed, Durability and Quality Castings

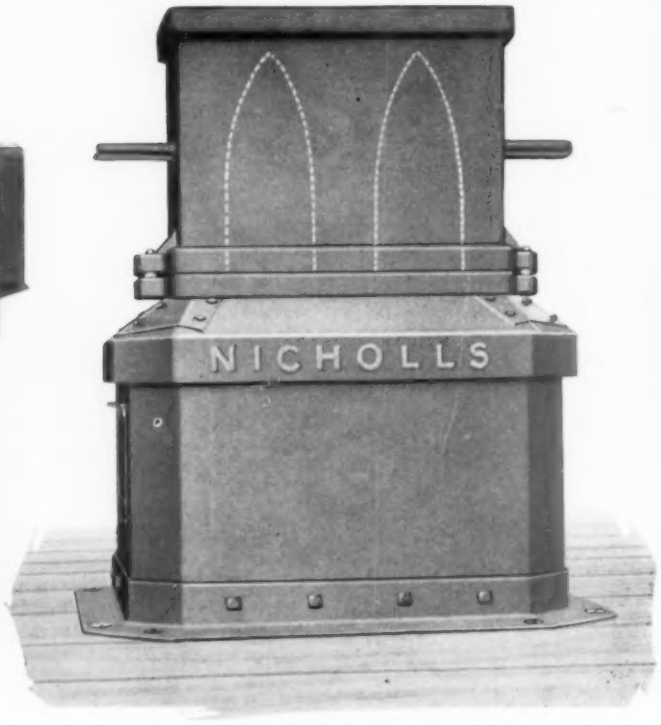
PIN LIFT JOLT STRIPPER MOLDING MACHINE

HARD JOLT—FAST ACCURATE DRAW



No. 8 Type JS Jolt Stripper Molding Machine with guard removed—7″ Diameter Jolt Piston, Adjustable draw from 9″ to 15″ in 2″ steps. All pins and bushings hardened and ground.

We are pleased to introduce our No. 8 Type JS Pin Lift Jolt Stripper Molding Machine, adaptable for making shells, sleeves and other deep draw work. We invite you to write for additional information regarding this machine.



Above No. 8 JS Machine as it would appear in foundry. All wearing parts are enclosed and fully protected from sand. Operating valve is mounted on separate stand not shown here.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL, LONG ISLAND, NEW YORK

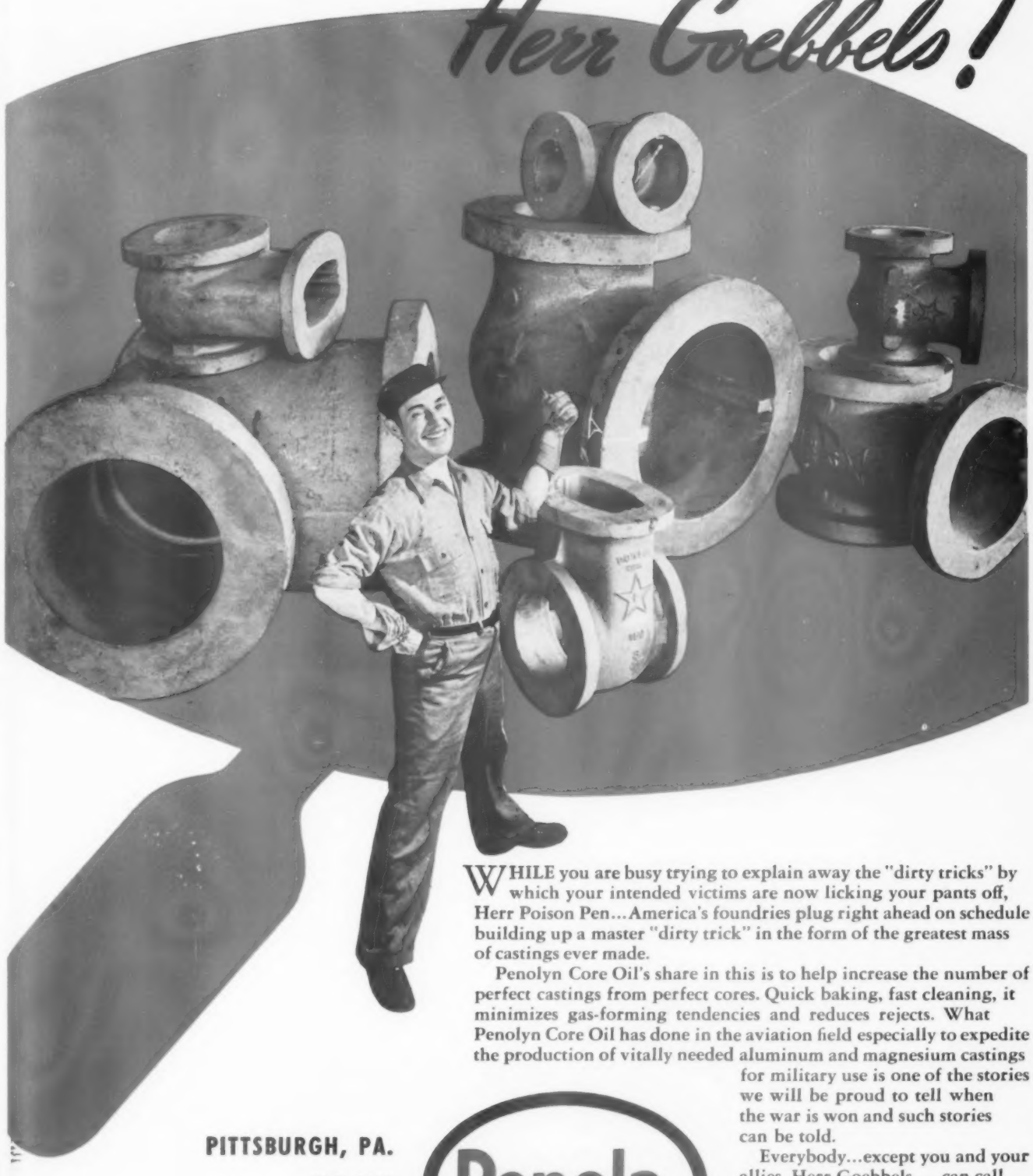
ESTABLISHED 1910

Foreign Manufacturers and Selling Agents—

For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland.

NICHOLLS

Look what's cookin' Now, Herr Goebbels!



WHILE you are busy trying to explain away the "dirty tricks" by which your intended victims are now licking your pants off, Herr Poison Pen...America's foundries plug right ahead on schedule building up a master "dirty trick" in the form of the greatest mass of castings ever made.

Penolyn Core Oil's share in this is to help increase the number of perfect castings from perfect cores. Quick baking, fast cleaning, it minimizes gas-forming tendencies and reduces rejects. What Penolyn Core Oil has done in the aviation field especially to expedite the production of vitally needed aluminum and magnesium castings for military use is one of the stories we will be proud to tell when the war is won and such stories can be told.

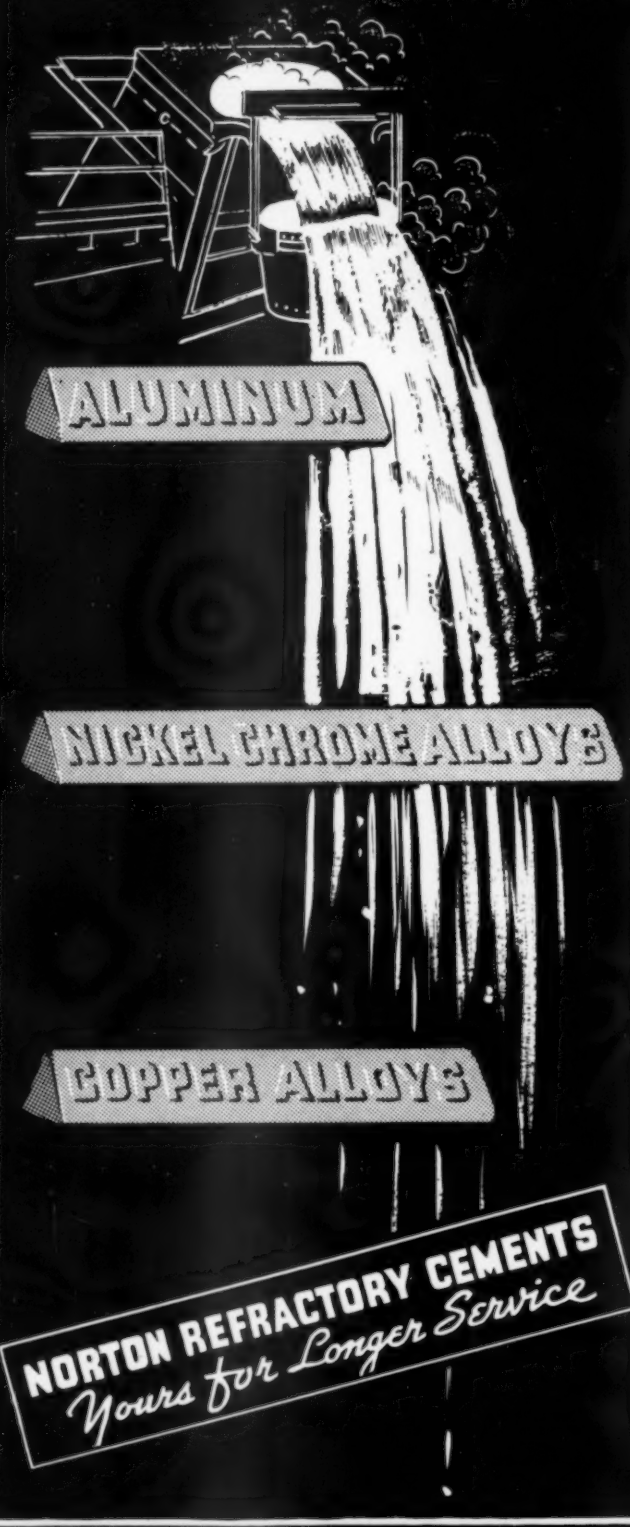
Everybody...except you and your allies, Herr Goebbels . . . can call upon Penola's engineers for help in solving casting problems. In fact, we urge them to do so!

PITTSBURGH, PA.

NEW YORK
CHICAGO
DETROIT
ST. LOUIS

Penola
Reg. U.S. Pat. Off.

For MELTING . . .



RC 1131 CEMENT — a *Crystolon* (silicon carbide) cement of very high refractoriness for ramming into oil or gas fired reverberatory and pit furnaces melting aluminum. Also recommended for melting copper and zinc.

RM 1169 CEMENT — a fused magnesia cement, ideal for lining Ajax-Northrup high frequency furnaces melting nickel-chromium alloys. Linings of this cement have given up to 350 heats in 600 to 1000 pound furnaces.

RM 1140 CEMENT — a fused magnesia cement for rammed linings in Ajax-Wyatt low frequency vertical ring induction furnaces melting high copper alloys (more than 85% copper), copper-nickel alloys, nickel silver, and cadmium bronzes. Successfully used by America's largest copper and brass melters.

NORTON COMPANY Worcester, Mass.

NORTON ELECTRIC FURNACE FUSED REFRACTORIES

75 TO 3000 HORSEPOWER

HORIZONTAL DUPLEX MOTOR DRIVEN DIRECT CONNECTED AND BELTED

* Only Worthington Compressors are Feather Valve equipped

Simplest . . . lightest . . . most efficient valve yet devised for compressor service.

- Each valve consists of light strips of steel whose easy flexing permits passage of air
- No cushioning device required
- Strips seat by contact . . . not impact
- Unusually tight . . . due to flexibility of strips
- Minimum air friction . . . result, minimum power consumption due to flexibility, large lift area and tight seating
- Maximum accessibility . . . removable in five minutes . . . replaceable in eight
- Intake and discharge valves complete are interchangeable
- Negligible maintenance . . . nominal expense for valve strip renewal at long intervals

* Reg. U. S. Pat. Off.

Thousands of horsepower of Worthington compressors are now carrying vital parts of the United Nations' war production load.

Among the most important of their many noteworthy features is their FEATHER VALVE equipment . . . giving high volumetric efficiency and smooth, quiet operation, and contributing largely to the remarkable dependability, negligible maintenance and long operating life reported by prominent users in every field and under the most exacting conditions.

Both the Navy E and Army-Navy E Awards have been presented to Worthington for speed and excellence in production.

AC3-4

WORTHINGTON PUMP AND MACHINERY CORPORATION • HARRISON, NEW JERSEY

Best by test

REPORTS FROM LARGE AND SMALL X-RAY LABORATORIES PROVE THAT *VITALIX* DEVELOPER REPLENISHER IS *"BEST BY TEST"* UNDER ALL WORKING CONDITIONS

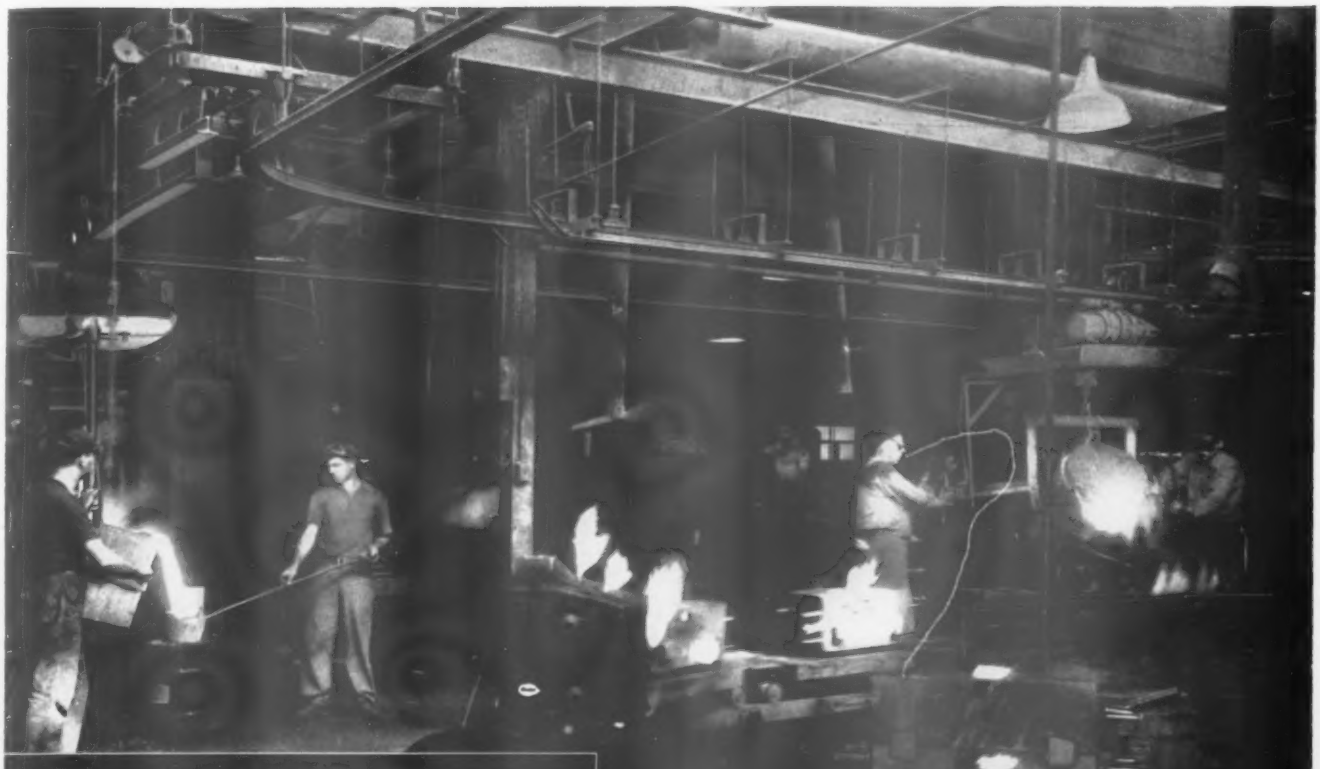
War plants, both large and small, have discovered a new method for speeding the production of industrial radiographs. Through the use of *Vitalix* Developer Replenisher, x-ray laboratories can now maintain processing schedules and secure uniform density in all x-ray films at the established developing time.

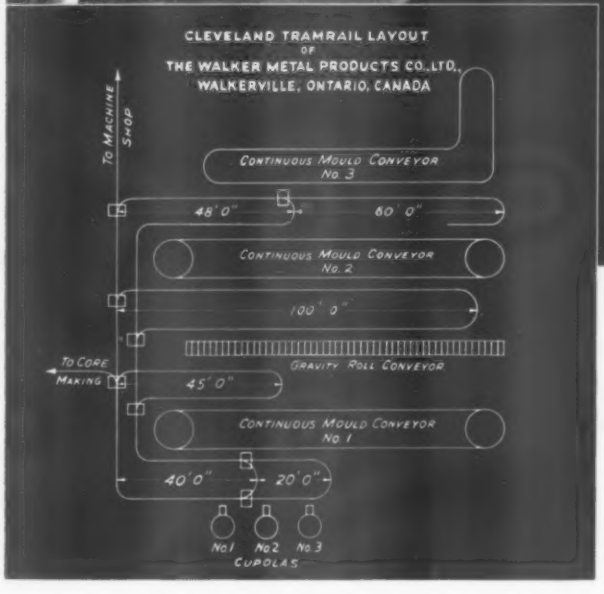
For *Vitalix* Developer Replenisher insures full strength solutions consistently. It replaces the exhausted chemicals with new, fresh, active ingredients, thus giving your "tired" developer a new lease on life.

You too will want to speed up x-ray processing procedure with this new Replenisher. To insure prompt delivery, please place your order for *Vitalix* Developer Replenisher—Now.

ARMY E NAVY

PICKER X-RAY CORPORATION
300 FOURTH AVE. • NEW YORK, N. Y.





This system is subjected to abrasive dirt, corrosive fumes and high temperatures. It is operated close to maximum capacity at all times, and usually is severely overloaded.

PEAK PRODUCTION FOR 14 YEARS

AT WALKER METAL PRODUCTS CO., LTD.

Installed in 1929, the Cleveland Tramrail foundry system at Walker Metal Products Co., Limited, Walkerville, Ontario, Canada, has been worked hard continuously ever since, even through the depression years of 1931-35. Approximately 150 tons of hot metal are conveyed over the main tramrail line daily.

Five one-ton hand-propelled carriers with push-button-operated electric hoists deliver the molten metal directly from the cupolas to the molds on the continuous mold conveyors. The Tramrail System works hand-in-hand with the mold conveyors and makes possible efficient mass production of motor blocks, cylinder heads, and a variety of other castings with minimum labor time per item.

Cleveland Tramrail is quality built and designed to operate successfully under rigorous conditions. Hundreds of foundries are profiting through its use.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

LET ME HAVE

HOT SAND

SAHARA

for

CONVEYING

AND ELEVATING

HOT MATERIALS

OF ALL KINDS

We Do Our Stuff!

613 feet of 30″ 8-ply SAHARA, installed in January, 1929 and conveying hot sand, was not replaced until January 17, 1939.

•

On July 6, 1925, a 527′ length of 30″ x 6-ply REXALL, installed on a castings conveyor ran until 9-15-37 (12 years) when 290 feet was ordered to replace portion damaged through accident.

NAMES ON REQUEST

•

Prewar Standards of Workmanship and Materials Maintained

•

CONTAINS NO RUBBER

GIVE ME THE

ROUGH STUFF

REXALL

for

CONVEYING

AND ELEVATING

COLD SAND,

CASTINGS, ETC.

IMPERIAL BELTING CO.

1750 S. Kilbourn Ave.
CHICAGO, ILLINOIS

★ACTION! The lightning-fast action of the famous PT boats has been a big factor in sending many Jap boats to the bottom.

Action on the home front, by every one of us — fast action to help the war effort — is our obligation to the boys who are giving their all on the fighting fronts.

So here at Acme we let nothing interfere with our job of supplying patterns, dies, fixtures, aluminum castings, and specialized tools needed by war production manufacturers to keep their production of war materials at the highest peak of efficiency and speed. Acme service is complete, including engineering counsel when desired.

If patterns, dies, castings, gages, made to the highest quality and precision standards, or if specialized engineering counsel on tools or equipment will help speed production in your plant, don't hesitate to call upon us.

For VICTORY buy WAR BONDS and STAMPS

ACME PATTERN & TOOL COMPANY, Inc., DAYTON, OHIO

Heat-Treated Aluminum Aircraft Castings · Patterns · Tools · Tool Designing · Production Processing

DELTA PARTEX WILL

(NUT SHELL PARTING)

SOLVE YOUR PARTING PROBLEMS . . . . . .

SEND FOR A LIBERAL WORKING SAMPLE
USE THE ATTACHED COUPON

DELTA OIL PRODUCTS CO
Milwaukee, Wis

Without obligation send us a sample of DELTA PARTEX (the Nut Shell Parting)

Name of Company.....

Address.....

Attention of.....

DELTA PARTEX (made from Domestic Nut Shells) is AMERICA'S "Replacement Product" for European Lycopodium.

DELTA PARTEX is Absolutely Free from Silicosis hazard.

DELTA PARTEX is non-reactive with molten metals.

DELTA PARTEX is free-dusting and has uniform surface affinity for sand which eliminates building up in core boxes and patterns.

DELTA OIL PRODUCTS CO.

Manufacturers of
Industrial and Automotive Oils, Greases and Compounds
MILWAUKEE WISCONSIN

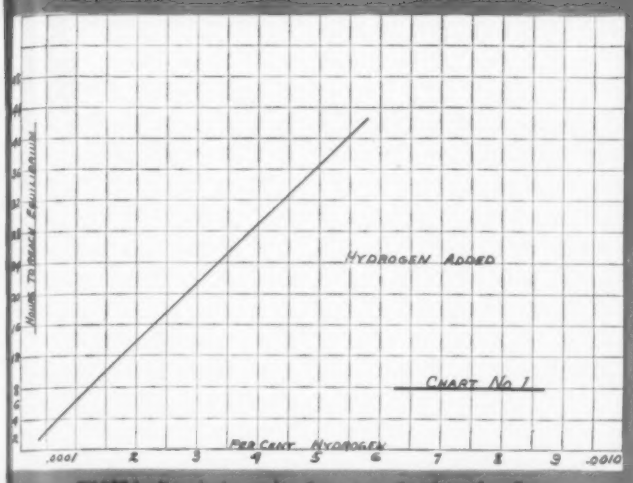


CHART I—How hydrogen lengthens annealing time of malleable iron. With hydrogen content only 0.0005%, time for coming to equilibrium may be prolonged to 36 hours, whereas with 0.0001% hydrogen, time is cut to 6 hours.

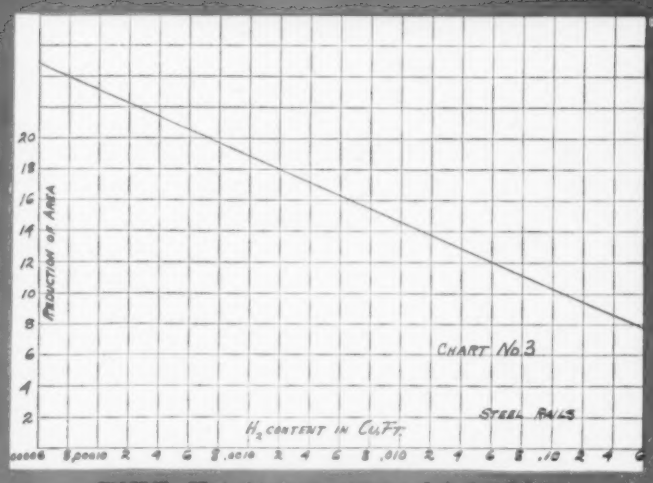


CHART III—Effect of hydrogen content on Reduction of Area in open hearth steel used for railroad rails. Note that reduction of area gradually diminishes as percentage of hydrogen in the steel increases.

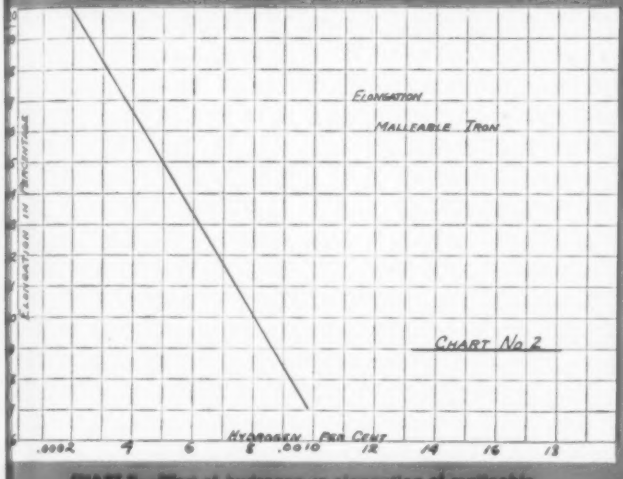


CHART II—Effect of hydrogen on elongation of malleable iron. Iron with 0.0009% hydrogen content has only 8½% elongation, but with 0.0002% hydrogen content has 20% elongation. A similar trend has been observed for tensile strength.

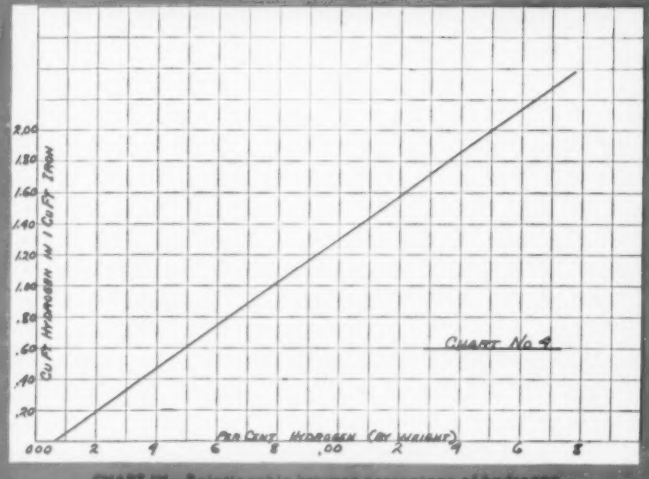
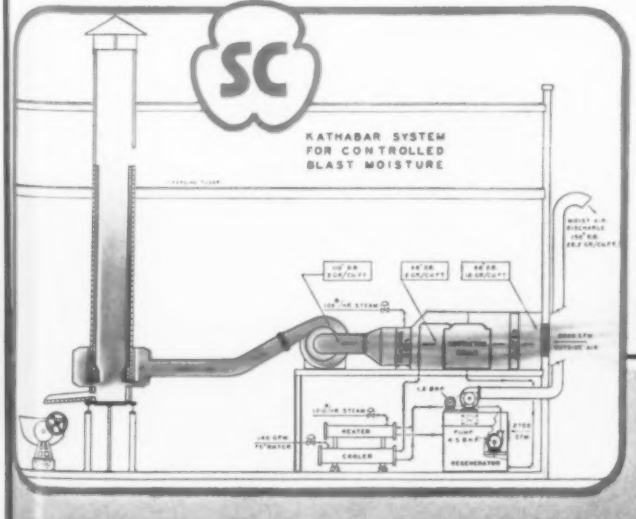


CHART IV—Relationship between percentage of hydrogen (by weight) and the corresponding volume of gas in a cubic foot of iron. To illustrate, 0.0008% hydrogen means that 1⅛ cubic foot of gas is dissolved in one cubic foot of iron.

HOW TO CONTROL HYDROGEN...*Ironmaster's Bad Boy*

HYDROGEN is the bad boy of metal production. It may seem uncontrollable, ever-present, persistent. The effects are always bad. An insignificant percentage (in weight) may be surprising in volume and in capacity for ill. For example, a hydrogen percentage of 0.0008 actually represents 1⅛ cubic foot of gas dissolved in one cubic foot of iron.

Hydrogen increases the number of cracked castings and prolongs the annealing time of malleable iron. In cast iron, it retards graphitization and increases depth of chill. In pig iron, it imparts properties that persist through successive remeltings, to cause steel "flaking," embrittlement, low elongation and reduction of area.



Recent studies prove that moisture in the air used for melting is responsible for the presence of hydrogen in metal. In one series of iron casts, for instance, moisture in the blast was varied. Then hydrogen analyses were made of the castings. Results revealed were:

1.49 grains moisture	—	.00004%	hydrogen	in	the	iron	
10.4	"	"	—.00009%	"	"	"	"
21.2	"	"	—.00018%	"	"	"	"

There is ample demonstration that drying the air blast with a modern moisture control system is a most practical way to eliminate trouble caused by hydrogen in iron, steel and non-ferrous metals. For several years, Kathabar Dry Blast systems have been protecting metal quality in numerous foundry cupola operations. Kathabar is available NOW to those companies engaged in vital war production.

WRITE for the free, 16-page, illustrated study, "The Effect of Moisture in the Manufacture of Metals," by R. J. Cowan.

SURFACE COMBUSTION · TOLEDO, OHIO

Also makers of Janitrol Furnaces and Unit Heaters, and SC Heat Treat and Heating Equipment.

Kathabar

MOISTURE CONTROL SYSTEMS

For Cupola, Blast Furnace, and Other Industrial Processing Operations

A SURFACE COMBUSTION PRODUCT

Laclede-Christy
St. Louis

...Meeting the Exacting Requirements of the Foundry Industry in its All-Out War Effort

Here, in the world's Center of High-Grade Refractories, Laclede-Christy offers speedy, intelligent cooperation to foundries and to all users of refractories in their war-winning assignments . . . Unsurpassed natural resources, experience and skill gained over a span of a century, plus the combined Engineering, Research and Manufacturing Units—all are available to you.

THE LACLEDE PLANT – actually three separate units, each equipped and mechanized to produce large tonnages at a rate which compares favorably with the most economical in the industry.

THE CHRISTY PLANT – also houses the Experimental Unit and the completely equipped, skillfully manned Research Laboratory which are responsible for numerous developments of new and finer refractories.

Laclede METALTITE
A jointing material designed for the Foundry Industry, to be used in melting furnaces under the most severe conditions — for laying up and coating fire brick; resists slag and high heat.

Laclede SUPER PLASTIC
Super duty refractory plastic fire brick for extremely high temperatures and severe service conditions.

Laclede FURNASEAL
High grade fire brick in plastic form for complete linings and repairs.

Laclede SETSKOLD C-7
Super refractory air-setting cement containing Kyanite base—for laying up high grade fire brick and super refractories and as a wash for refractory walls. Also used for Stopper Rods, as a well wash and for electric furnace roofs. In wet form.

Laclede Cupola Blocks

Laclede WALLAC Stiff-Mud De-aired Side Wall Brick

Laclede Malleable Furnace Bung Brick

Laclede SPALLAC Super-Duty Fire Brick

Laclede Sleeves and Nozzles for hot metal

LACLEDE-CHRISTY CLAY PRODUCTS CO. • ST. LOUIS, U.S.A.

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FASTER DRYING

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MAHR

ENGINEERS • DESIGNERS • MANUFACTURERS
ALL EQUIPMENT FOR METAL HEATING

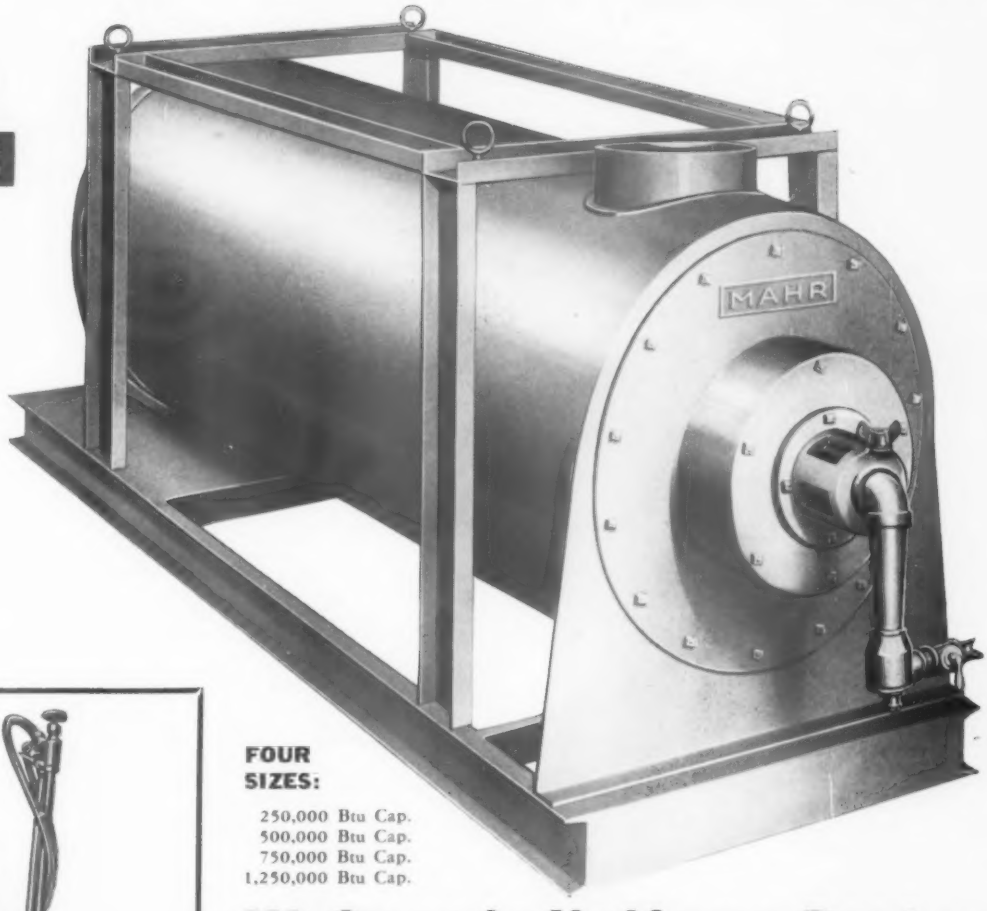
portable

MOLD DRYER

FAST HEAT-UP
QUICK DRYING

OIL OR GAS FIRED

HEAVY STEEL
CONSTRUCTION



FOUR SIZES:

250,000 Btu Cap.
500,000 Btu Cap.
750,000 Btu Cap.
1,250,000 Btu Cap.

Hi-Speed, Uniform Drying

Large, cumbersome molds are difficult to handle in drying, yet proper and quick drying is one of the most important elements in producing a good casting. After long and exhaustive study and tests of many drying methods in our own and other foundries, we are proud to announce this newest member of an old family.

Designed by an organization long experienced in industrial heat application, and thoroughly tested under everyday foundry conditions with outstanding performance results. Heat-up time is extremely fast. Large volumes of hot gases are forced into every part of the mold for fast, complete drying. Normal drying times are shortened.

With contracts for many very large castings today, several foundries are already using batteries of these dryers with a great saving in time and costs.

The entire unit is mounted on a heavy channel steel frame, and can be quickly moved and set up for use on any large mold. Fuel may be either gas or oil. Economy in operation is one of its features because of rapid and complete combustion.

FOR OVER A QUARTER CENTURY, the name MAHR has been associated with industrial heat equipment of quality and the most modern design. These products include CORE AND MOLD OVENS, FURNACES OF ALL SIZES AND TYPES FOR ANNEALING, STRESS RELIEF, ETC., FORGES, TORCHES, BURNERS, BLOWERS AND VALVES.

Write, Wire, or Phone for Bulletin and Prices

Get our fully illustrated and descriptive bulletin telling all about this dryer. It can be used nearly every day in any foundry. Write, wire or phone TODAY for complete information.

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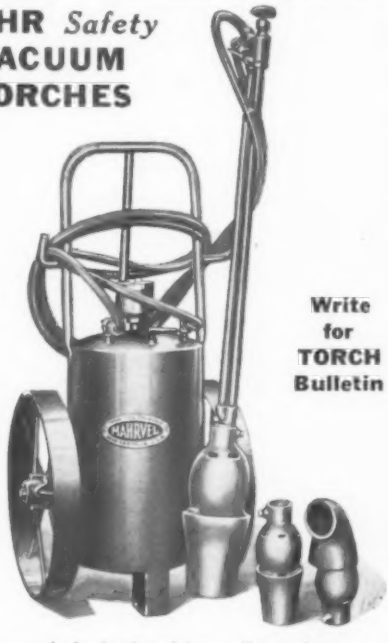
MAHR MANUFACTURING CO.

DIVISION OF DIAMOND IRON WORKS, INC.

1709 NORTH SECOND STREET • MINNEAPOLIS, MINNESOTA, U. S. A.

MAHR *Safety* VACUUM TORCHES



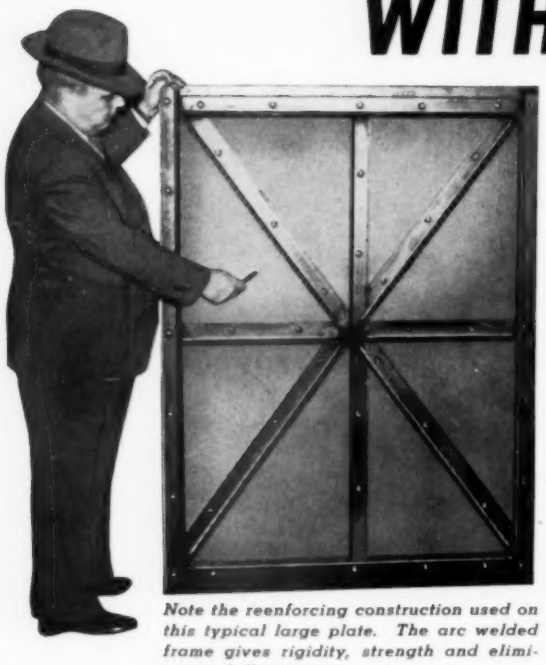
Write for TORCH Bulletin

Used extensively in foundries, railway shops, etc. wherever intense heat is needed. Throws long, hot flame. Burns kerosene. Lights instantly without pre-heating. It's safe!

MAHR JIFFY TORCH

Produces steady, intense flame to 5 feet. Lights instantly — no pre-heating. Operates from compressed air line at 30 lbs. or more. 2 sizes.

CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!



Note the reenforcing construction used on this typical large plate. The arc welded frame gives rigidity, strength and eliminates deflection.

IT IS BEING DONE ON DIAMOND REENFORCED STEEL CORE PLATES

These special core plates are designed to carry large cores up to 1200 lbs., cores of any size, without deflection or warping.

You may obtain Diamond Core Plates to suit your own special requirements. They are furnished with or without perforations and in all smaller, standard sizes—plain or reenforced as indicated by your needs.

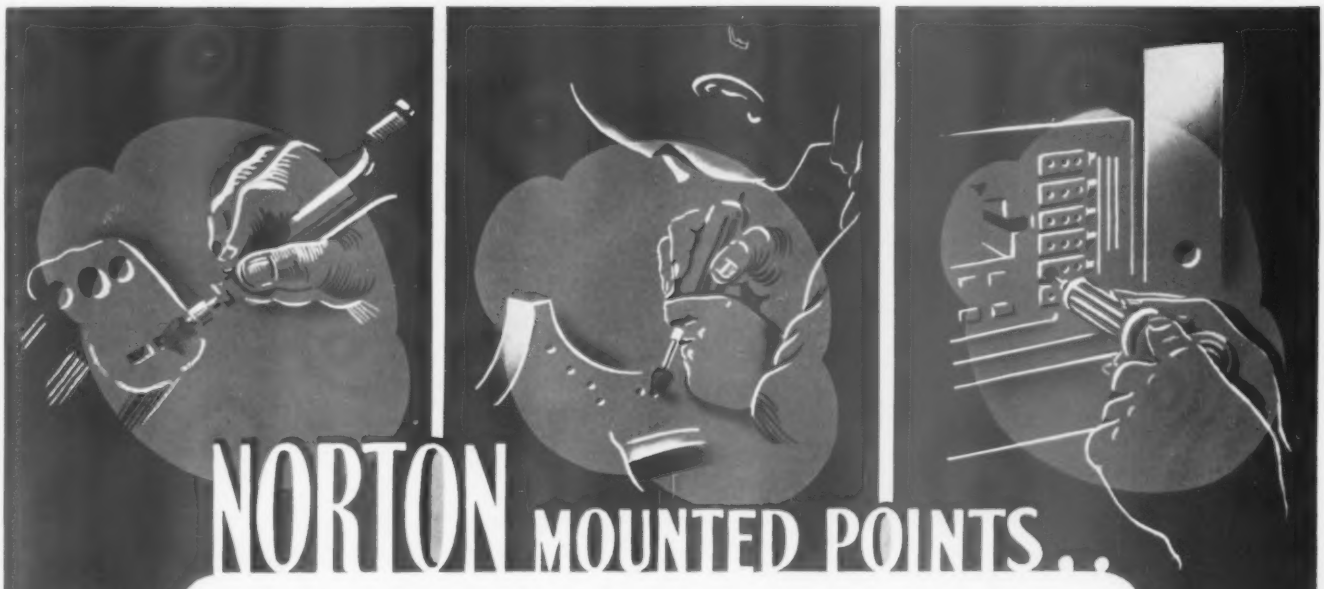
Send us detailed information on your core baking problem and we'll be glad to design a plate to handle the job. Weight of core and dimensions, in particular.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889



NORTON MOUNTED POINTS..

Little Things that can be a Big Help

THERE are literally hundreds upon hundreds of war jobs on which these Norton spindle mounted grinding wheels can be a big help. Not only in the tool room for making molds and dies but on countless production jobs they provide the quickest and easiest way to remove metal. You will find Norton points of Crystolon abrasive especially handy for the hard-to-get-at places on small nonferrous castings—and Alundum points equally good on steel castings.

There's a Norton catalog that shows the complete lines of sizes and shapes. Write today—asking for Form 43-F.

NORTON COMPANY, WORCESTER, MASS.

and MOUNTED WHEELS

Nearly 200 Standard Sizes and Shapes

NORTON ABRASIVES

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT MOLDING AND CORE SAND SILICA

A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT IT PAYS TO USE SHOT

DIAMOND SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

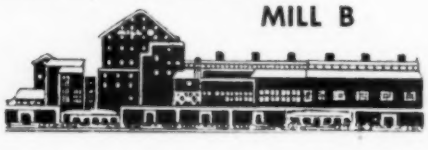
CRYSTAL 99% PURE SILICA

OTTAWA SILICA COMPANY

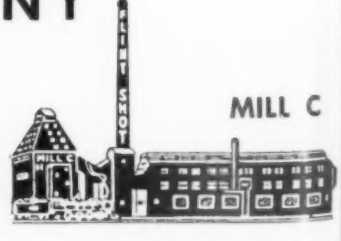
Ottawa, Illinois

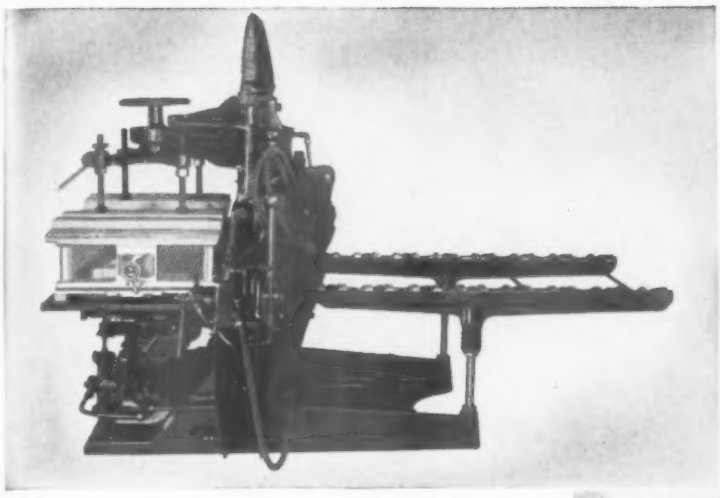
MILL A

MILL B



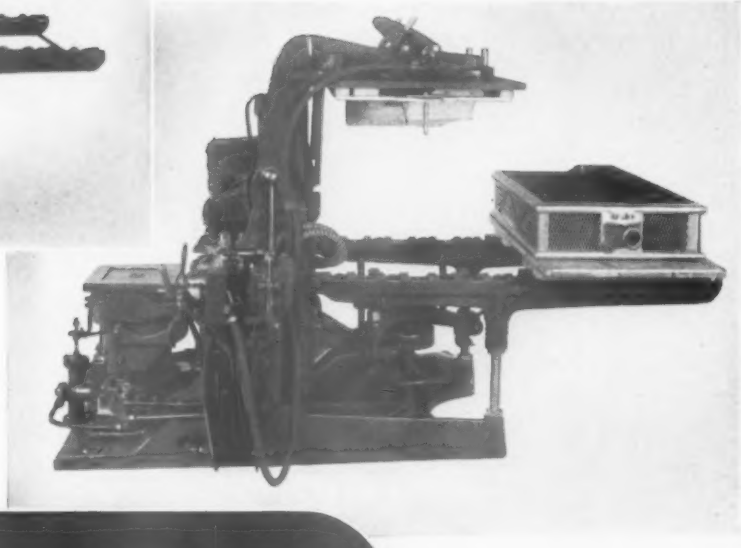
MILL C





Above—View of No. 815 Jolt, Roll-Over Pattern Draw Machine Clamped, Equalized, and ready for Roll-Over Operation.

At Right—View of same Machine after Rolling Over, Showing Perfect Pattern Draw.



A FAST HIGH PRODUCTION JOLT, ROLL-OVER PATTERN DRAW MACHINE FURNISHED IN THREE SIZES

• Johnston-Jennings Jolt Roll-Over Pattern Draw Machines meet every requirement for fast, easy, efficient work. They assure maximum production even with relatively unskilled operators,—and are standard equipment in most large aluminum and magnesium foundries. These machines are built in three sizes and require no pits. They are of open end construction and incorporate many design and operating refinements much appreciated by practical operating men. Our fully descriptive catalog giving complete details of this and other Johnston & Jennings molding machines furnished gladly on request — No obligation — Send for a copy today.

THE JOHNSTON & JENNINGS CO.

867 ADDISON ROAD • CLEVELAND, OHIO

A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16″ draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

Write for fully descriptive catalog giving complete specifications.

for Victory!

FANNER SUPERCHILLS

(Patented)

No small part in the Victory program has fallen to Fanner Superchills.

When foundry production has been doubled and tripled to overcome the possibility of there being "too little too late"—when production minutes and methods count as they never did before—*when even the loss of a single casting for want of proper cooling* seriously effects the speed of the all-out effort . . . Fanner Superchills take on the importance of an absolute "must" wherever castings are made.

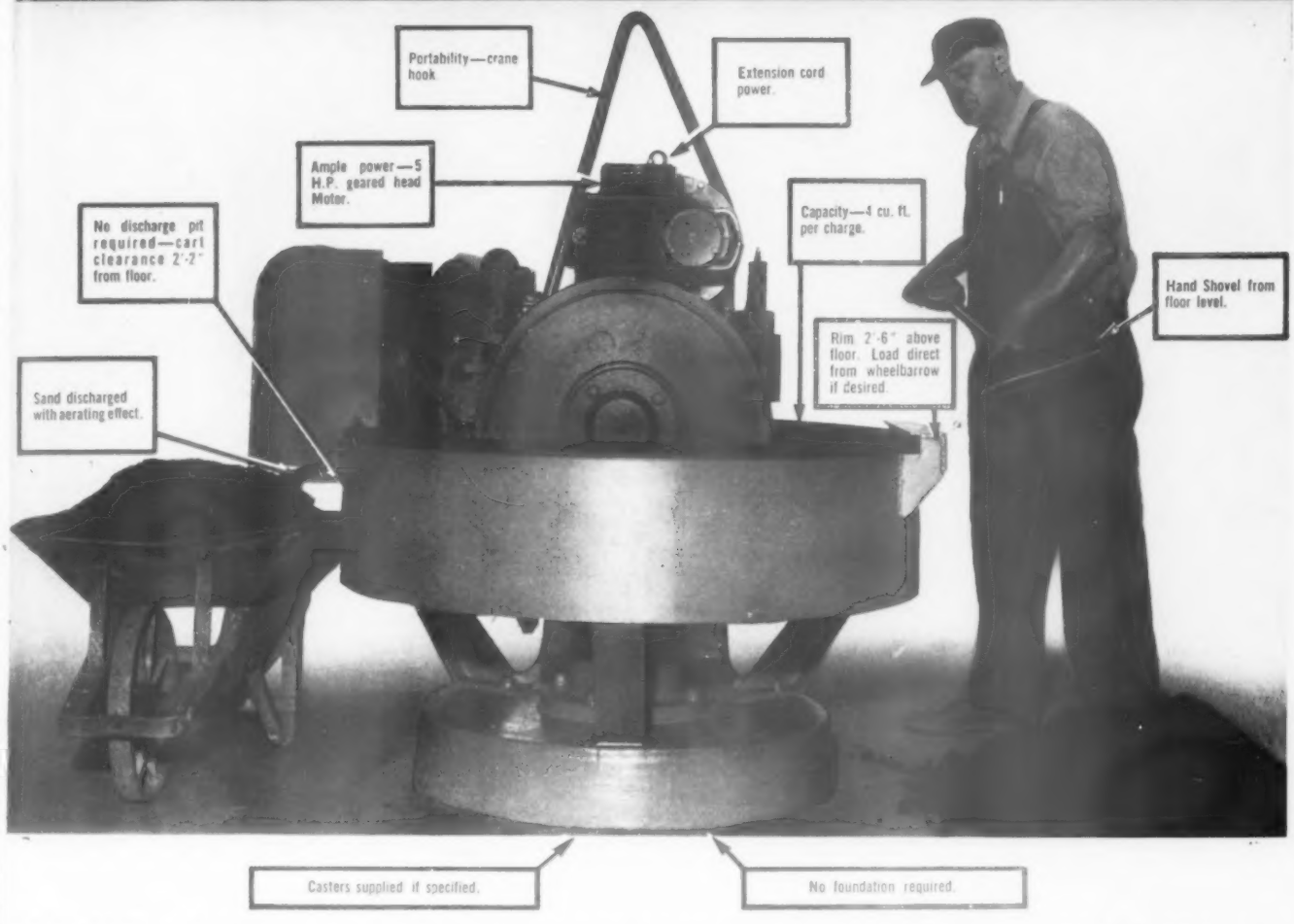
Our engineering staff is at your service at all times in helping you make better castings faster and more economically through the use of the proper Fanner Superchills, Chills and Chaplets.

THE FANNER MANUFACTURING CO.

Brookside Park, Cleveland, Ohio • Canadian Fanner, Ltd. Hamilton, Ontario

The CLEARFIELD "404" MIXER

SELF-CONTAINED SINGLE ONE UNIT LEVEL . . . COMPLETE WITH BASE AND DRIVE


Portability—crane hook.
Extension cord power.
Ample power—5 H.P. geared head Motor.
No discharge pit required—cart clearance 2'-2" from floor.
Capacity—4 cu. ft. per charge.
Hand Shovel from floor level.
Rim 2'-6" above floor. Load direct from wheelbarrow if desired.
Sand discharged with aerating effect.
Casters supplied if specified.
No foundation required.

READILY PORTABLE FOR EASY OPERATING CONDITIONS . . . REQUIRES NO HOISTING AND CONVEYING APPARATUS . . . NO DISCHARGE PIT!

Mixing unit efficiency plus cost of operation is greatly affected by time and labor required for sand feeding and disposal. Moderate tonnages do not always warrant complete conveying systems, and in many foundries, sand preparation may be built around the portability of the mixing unit.

For such usage, the Clearfield "404" definitely leads the field with its wide range of usefulness. Small, compact, and low-power consumption, the Clearfield "404" is especially suitable either for small foundries where a single mixing unit is employed or in the larger foundries where work is departmentalized for several classes of sand.

The many enumerated Clearfield "404" features are justified proof of convenience and economy together with an absolute minimum of auxiliary equipment.

Write for **CLEARFIELD "404" DATA!**

CLEARFIELD MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

advice . . .

the right wheel selection IS NOT ENOUGH . . .

you must also have the right machine before "you'll get the most out of your

ABRASIVES

Marschke
THE QUALITY LINE
Pedestal • Floor Stand • Swing Frame
Grinders-Buffers
10" to 30" Wheels, 1 to 25 HP, Single and Multiple Speeds

MARSCHKE 3-SPEED SWING FRAMES SAVE YOU MONEY

because . . .

having selected the right grade, grit and bond . . .

1. Wheel is held firmly between accurately machined flanges.

2. Wheel rotates smoothly upon a stiff true-running spindle.

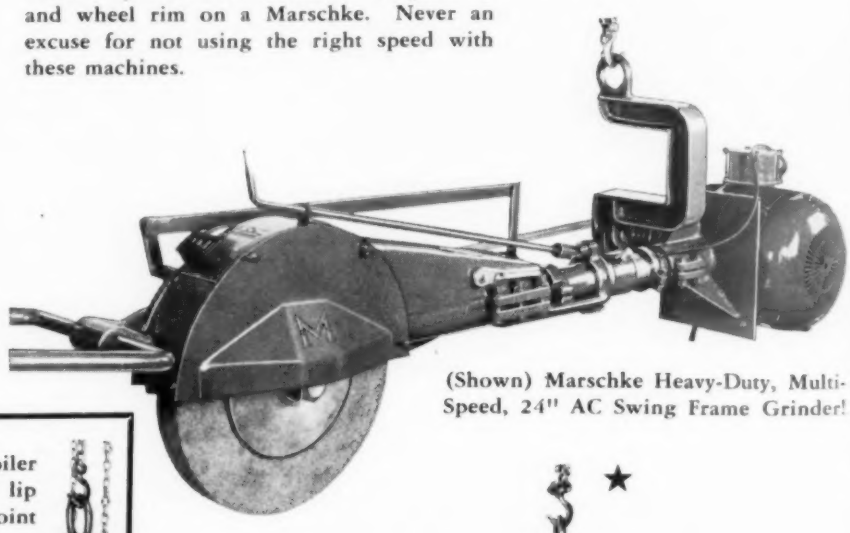
3. Wheel can be kept at right cutting speed because incorrect wheel speed is plainly indicated by the tell-tale relation of spark lip and wheel rim on a Marschke. Never an excuse for not using the right speed with these machines.

4. And Marschke design includes the *conveniences* for making changes quickly so they are made when needed to maintain maximum grinding efficiency.

★ Over 70 specifications of Marschke Swing Frame, Floor Stand and Pedestal Grinders and Buffers—from 1 to 25 HP. Each built to machine tool standards . . . made to give long, dependable service under toughest, grittiest operating conditions.

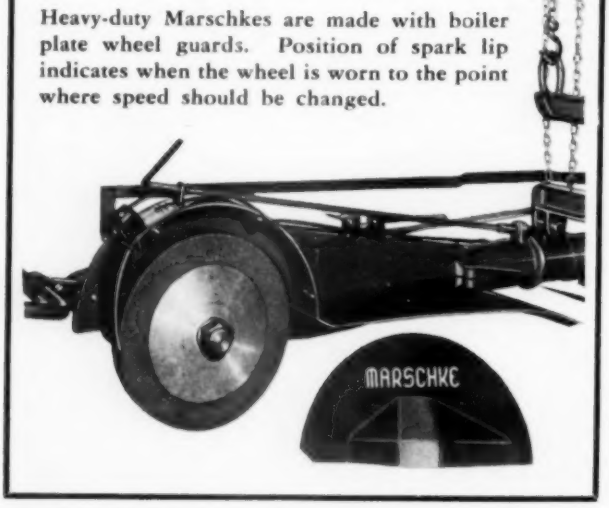
Write for Catalog to

VONNEGUT MOULDER CORPORATION
1839 Madison Avenue
INDIANAPOLIS, IND.

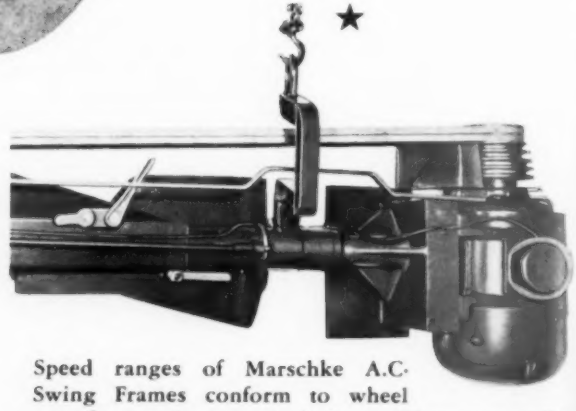


(Shown) Marschke Heavy-Duty, Multi-Speed, 24" AC Swing Frame Grinder!

Heavy-duty Marschkes are made with boiler plate wheel guards. Position of spark lip indicates when the wheel is worn to the point where speed should be changed.



★ ★



Speed ranges of Marschke A.C. Swing Frames conform to wheel manufacturers' recommendations. Three-step pulley (shown) provides correct speeds for new, partly worn and well worn wheels.

WHAT AJAX SIGNIFIES

AJAX METAL COMPANY

AJAX NON-FERROUS INGOT METALS: The first program for scientific control of ingot metal production was set up in and by the Ajax Metal Company 45 years ago. The result continues to be a sense of sureness and ction in all the dealings of foundrymen with this ny. **Philadelphia, Pa.**

AX ELECTRIC FURNACE CORP.

Division of Ajax Metal Co.

AJAX-WYATT INDUCTION MELTING FURNACES: Virtually all the brass mills in North America use these furnaces because they have the lowest metal losses in the field—less than 1%—with superior temperature ntrol and unapproached economy of operation on gh production schedules such as we have today. iladelphia, Pa.

AJAX ELECTROTHERMIC CORP.

Division of Ajax Metal Co.

HIGH-FREQUENCY MELTING AND HEATING: Development of high frequency melting and induction heating as early as 1916 represents a basic contribution of Ajax research to metallurgical art. Use of Ajax-Northrup units is the trend in melting high alloy tool steels, magnet steels; for centrifugal castings; and heating for hot-forming. **Trenton, N. J.**

AJAX ELECTRIC CO., INC.

Division of Ajax Metal Co.

AJAX-HULTGREN SALT BATH FURNACES: Over a thousand of these furnaces have been installed. For practically every heat-treating operation from 300° F. to 2400° F., the Ajax-Hultgren Electric Salt Bath Furnace has definitely proved its advantages and received the acclaim of leading metallurgists throughout the world. **Philadelphia, Pa.**

AJAX ENGINEERING CORP.

Division of Ajax Metal Co.

ALUMINUM MELTING FURNACES: Advantages inherent in the original Ajax-Wyatt low-frequency melting principle and design are found in the Ajax-Tama-Wyatt furnace, incorporating original and specific features for aluminum melting, permitting production of homogeneous alloys with diminished oxidization and no danger of overheating or underheating. **Trenton, N. J.**

SINCE 1880

Increase Production with
ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!

ORDER FROM YOUR FOUNDRY SUPPLY HOUSE

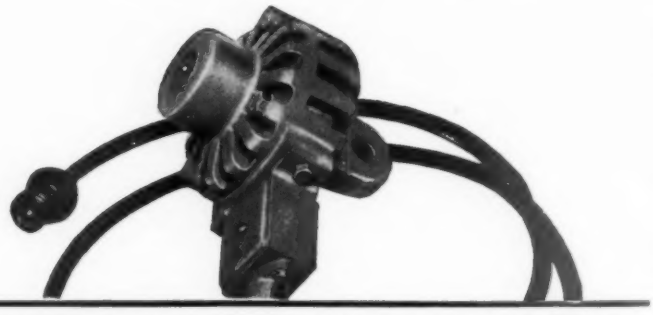
Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL.

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, one sieve (2-4 mesh). Standard ½ h.p. motor, 115-230 volts 60 cycle single phase.
Prices with other motors quoted on request.



ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

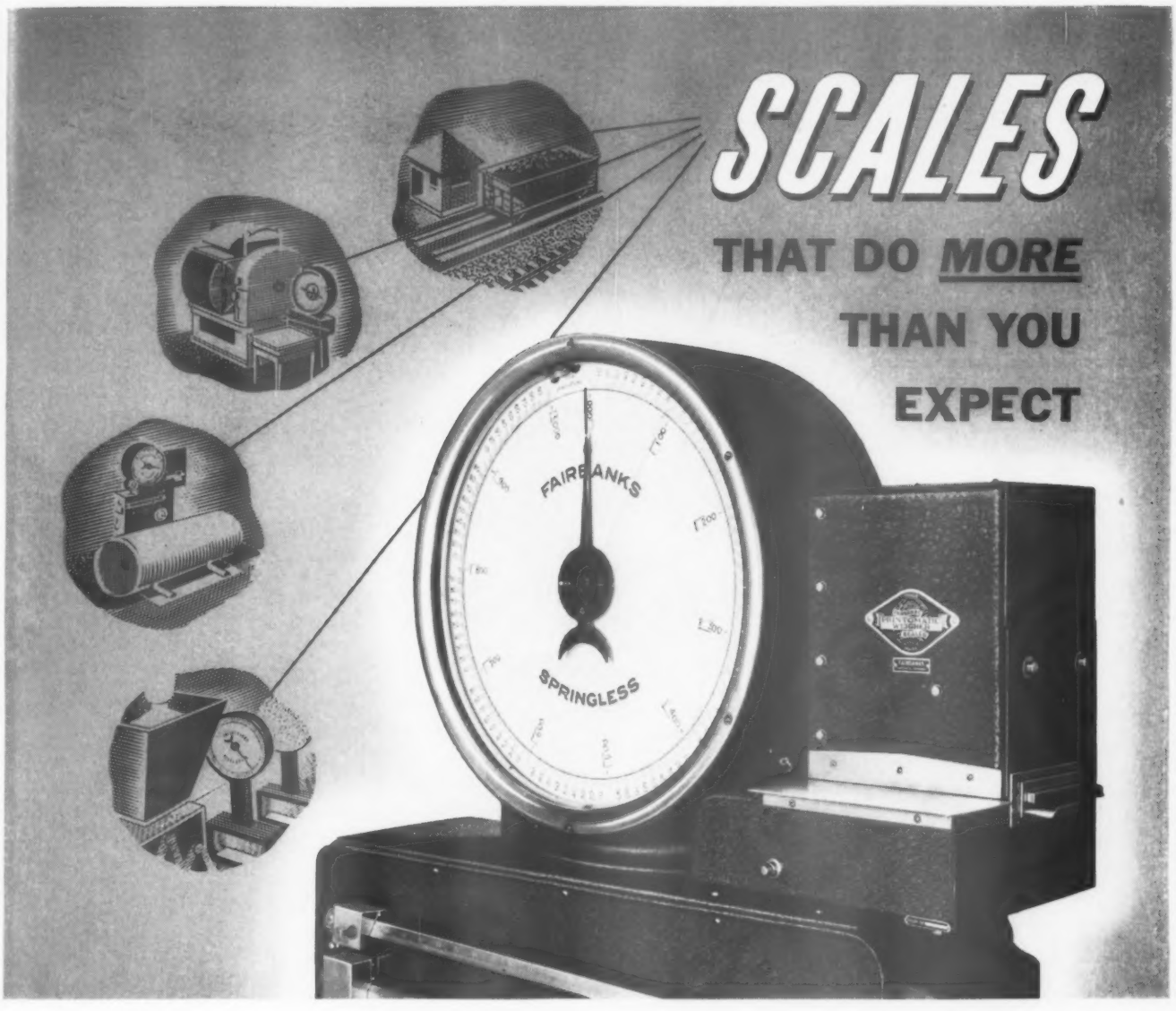
No. 1—Light match plate work..... $10.00	No. 5—Heavy match plate, tub, bench $17.00
No. 2—Medium match plate 13.00	No. 9—Machine and heavier 24.00

•

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street Chicago, Illinois

CABLE ADDRESS: "ROTOPLANE CHICAGO"



OF course, Fairbanks Scales are big, husky, and accurate. You have a right to expect these things in *any* good scale—and particularly of Fairbanks Scales with the world's broadest scale manufacturing experience behind them.

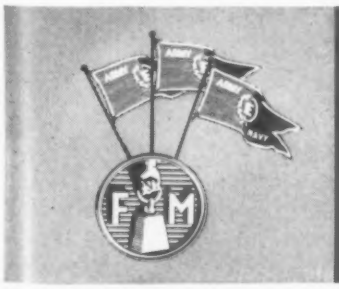
The feature about Fairbanks Scales that may surprise you the most, is their ability to do things you *don't* expect of scales.

Here are a few of many jobs done by Fairbanks Scales:

- They count small parts—more accurately than manual counting
- They weigh carloads of coal in motion and make a printed record of each weight
- They automatically control paint ingredients
- They automatically control aggregates
- They "keep the books" in steel plants, making printed records of incoming and outgoing shipments
- They keep accurate records on chlorination in water treatment
- They record the *flow* of liquid chemicals
- They guard secret formulas in compounding
- They control batching in bakeries
- They prevent disputes by eliminating the human element in weighing.

AND all of these things, only the beginning of the story, they do automatically and mechanically thereby eliminating human errors.

How Fairbanks Scales can be fitted into your production flow to speed up operations and eliminate errors may prove to be the most interesting discovery you ever made. Investigate now. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.



FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
SCALES
WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT

FAIRBANKS SCALES

Scales

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

An Important *NEW* Source of

Fine Silica Sand

Washed, Dried and Graded

★

A.F.A. FINENESS
50, 60 and 70

★

From the World-famous St. Peter Silica Sand Deposit

"The Roundest Grain in the World"

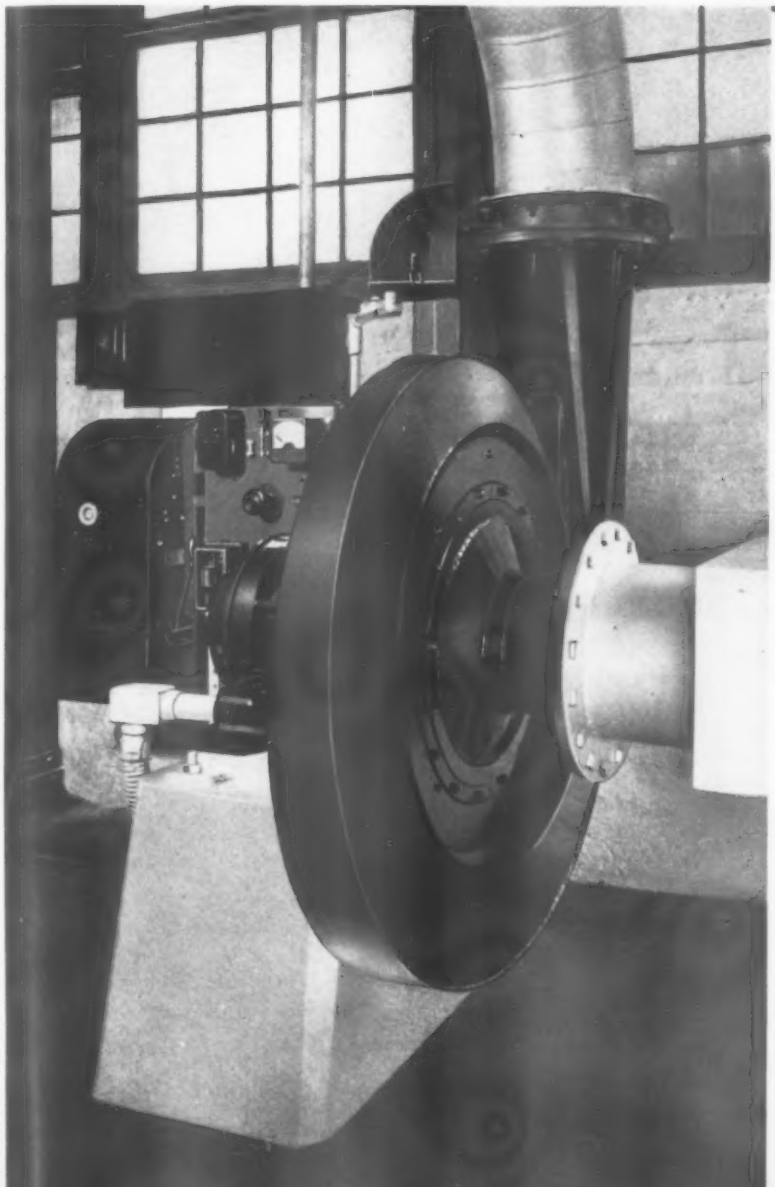
Our production is increasing daily—we suggest you check with us against your present and future needs. We'll be in St. Louis for the Conference.

ST. PETER SILICA CO.

STRONG BLDG. *Phone 6565* **BELOIT, WISC.**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

CONTINUOUS, EFFICIENT CUPOLA OPERATION REQUIRES ACCURATE CONTROL



The Ingersoll-Rand "FS" Motorblower with Constant Air-Weight Control gives the foundryman such service and enables him to:—

1. Adjust blast to proper value
2. Maintain blast constant
3. Repeat daily performance
4. Maintain continuous, trouble-free operation of blowing equipment.

The I-R equipment is a result of 14 years experience in applying "controlled blast" to cupolas. Let our local representative call and study your problem.

Atlanta, Birmingham, Boston, Buffalo, Butte, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Duluth, El Paso, Hartford, Houston, Kansas City, Knoxville, Los Angeles, Newark, New Orleans, New York, Philadelphia, Picher, Pittsburgh, Pottsville, Salt Lake City, San Francisco, Scranton, Seattle, St. Louis, St. Paul, Tulsa, Washington

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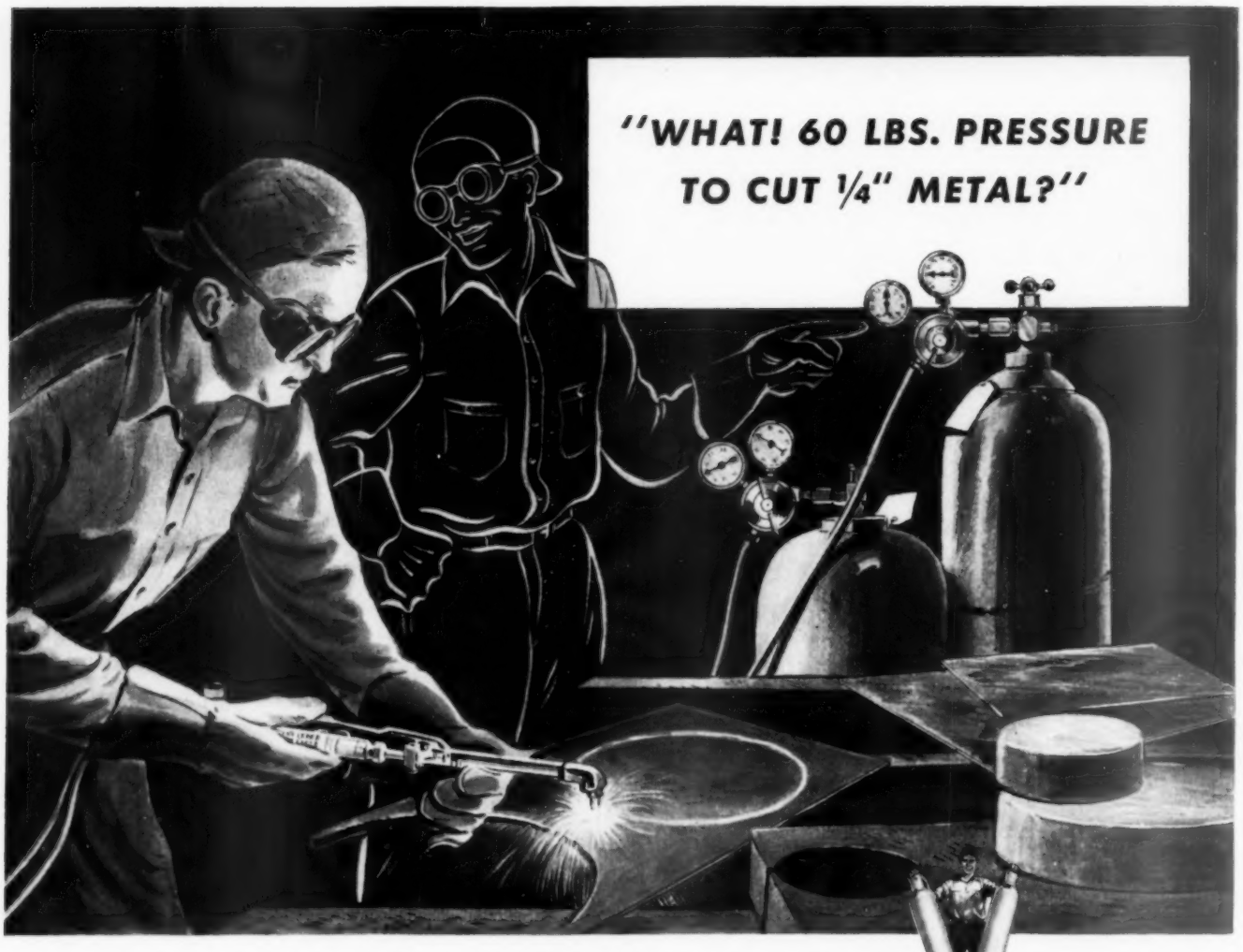


DON'T USE EXCESSIVE PRESSURES OR OVER-SIZE TIPS

In the scene above the operator has just finished cutting 4" thick plate using a size 5 tip and 60 lbs. oxygen pressure. But when he starts cutting ¼" thick metal, he neglects to change the tip and reduce oxygen pressure to 30 lbs. As a result he wastes oxygen at the rate of 335 cu. ft. per hour.

Of course this is an extreme case, but it shows how careless selection of tips and pressures can quickly waste large quantities of oxygen. Even cutting ½" metal with the same tip and pressure used to cut 1" metal consumes twice the amount of oxygen *really* needed. Moreover, the quality of the finished cut is usually poorer when recommended pressures and tip sizes are *not* observed. On close-tolerance cutting such carelessness might ruin a large plate, or at least delay its fabrication into a much-needed war weapon.

Do your part to prevent needless waste of oxygen. Always be sure that tips and pressures are correct for the thickness of metal to be cut. Make yourself a Waste Warden and make the most of all strategic production materials.

THE WASTE WARDEN says:

"RETURN EMPTY CYLINDERS PROMPTLY"

DO close cylinder valve after use.

DO check hose and connections for leaks.

DO keep your cylinder inventory low.

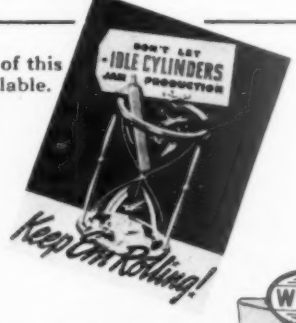
* * *

DON'T use excessive pressures or oversize tips.

DON'T leave torch burning when not in use.

DON'T abuse cylinders.

Free copies of this poster available.



Air Reduction

General Offices:
60 EAST 42nd STREET, NEW YORK, N. Y.
IN TEXAS
MAGNOLIA-AIRCO GAS PRODUCTS CO.

AIRCO

WILSON

IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em rolling for victory!*

TESTING EQUIPMENT METALLURGICAL LABORATORY

Personal daily contact with the requirements of the metallurgist enables the Adolph I. Buehler organization to design equipment built for the job—A complete line of metallurgical laboratory equipment available from a single reliable source.

THE 1315 AB Specimen Mount Press is designed for speed and convenience in moulding mounts, either 1" or 1¼" size. The 1500 AB Standard Polisher is in daily use in hundreds of metallurgical laboratories. Vibrationless operation, sturdy construction with maximum conveniences for the operator, makes this polisher cover a wide range of usefulness. The 1540-3 AB Multiple-Unit polishing table is for industrial production laboratories. This newly designed polishing table can be fitted with either standard or low speed polishers.

1315 AB Specimen Mount Press

1540-3 AB Multiple-Unit Polishing Table

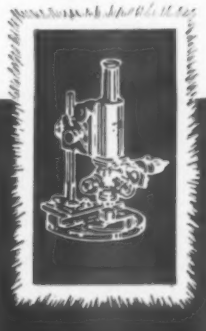
■ Standard Bakelite Mount

Transoptic Mount

1500 AB Standard Polisher

A complete line of equipment for the Metallurgical Laboratory

SPECIMEN MOUNT PRESSES — POLISHERS — POLISHING ABRASIVES — POLISHING CLOTHS — POWER GRINDERS — BELT SURFACERS — CUT-OFF MACHINES — HAND GRINDERS — CARBON METERS — COLORIMETERS — HARDNESS TESTERS — DUST COUNTERS — DILATOMETERS — EMERY PAPER GRINDERS — LABORATORY CHAIRS TITRATORS — MAGNIFIERS — METALLOGRAPHS — MICROSCOPES — STEREOSCOPES PYROMETERS — REFRACTOMETERS — SPECTROGRAPHS — MACRO CAMERAS



Adolph I. Buehler

OPTICAL INSTRUMENTS ★ METALLURGICAL APPARATUS

228 North LaSalle Street, Chicago, Illinois

"I LIKE THIS *Pin Guide!*"

To anyone engaging in snap work, the 1" "Groovlock" pin is regarded as the happiest inspiration ever put to practical use on a foundry flask. It is a simple idea, but its very simplicity is its strongest point. Through its employment molds can be closed quicker, without the chance of tilting or breaking. In EVERY case where the "Groovlock" pin has been introduced as a new factor, production has been DEFINITELY INCREASED.

FREMONT FLASKS and JACKETS are chiefly renowned for their efficiency and long wear. In many foundries where they have been thoroughly tested, other types of older flasks were scrapped, and FREMONT flasks were made standard equipment. Their terrifically sturdy construction retains accuracy, yet their light weight makes them easy to handle. While the FREMONT flask with the 1" "GROOVLOCK" pin is particularly adapted to snap work, they can be furnished with cast ears on the ends to accommodate your standard pins.

THE FREMONT FLASK COMPANY

FREMONT, OHIO

Slip Flasks **FREMONT** GROOVLOCK *Jackets*

HOW TO GET HERE

for the Important

WAR PRODUCTION CONGRESS

and AFA Convention

April 28-30

St. Louis is one of the easiest big cities in the country to get to quickly and comfortably. Served directly by two-score or more transportation lines, the following will bring you here by direct routes:

●

RAILROADS

Alton R. R.
Baltimore & Ohio
Burlington
C. E. & I.
Gulf, Mobile & Ohio
Illinois Central
Illinois Terminal R. R.
L. & N.
Missouri & Pacific
New York Central
Nickel Plate
Pennsylvania
Rock Island
Southern
Wabash

AIRLINES

American Airlines
Chicago & Southern

BUSES

All American Lines
De Luxe Motor Stages
M. C. Foster Lines
Greyhound Lines
Jacksonville Trailways
MK & O Coach Lines
Missouri & Arkansas Lines
Missouri Transit Lines
Missouri Pacific Trailways
Santa Fe Trailways
Tri-State Trailways

● Several late afternoon trains arriving here in the evening have excellent day-coach accommodations which you might check if time doesn't permit making advance reservations.

St. Louis

We here at "Midwest" join the St. Louis Chapter in extending an urgent invitation for you to attend this important War Conference.

We hope you will come to contribute your share to the meetings and take many ideas home–we'll win this war and bring our boys home sooner by "coming, keeping and working together!"

★

We are serving an increasing number of foundries and patternshops, having (as we do) ample facilities to give prompt service on quality foundry materials and supplies—with particular reference to *Controlled Foundry Sands.* We'll be glad to meet you while you're in St. Louis or have you visit our new Warehouse and Offices "across the river" in nearby Edwardsville.

MIDWEST FOUNDRY SUPPLY CO.

ST. LOUIS OFFICE
2 Armin Place—Phone Republic 5097

EDWARDSVILLE, ILL.—*Main Office & Warehouse*
270 W. Union—Phone 76

How the *Airless* WHEELABRATOR *is Setting the Pace* in Metal Cleaning Production

A Bearing Mfg. Co.: "At our present rate of production it would be impossible to use slower methods."

An Aircraft Engine Co.: "It would be impossible to get along without Wheelabrator. Using other types of equipment would require at least ten times the floor space."

A Pennsylvania Brass Foundry: "Wheelabrator has increased production speed over our previous method approximately 300%."

A Large Steel Foundry: "Wheelabrators have doubled our production speed over previous methods."

An Ohio Foundry: "We have increased our tonnage from 10,000 lbs. to 30,000 lbs. or more per day, and the Wheelabrators have been doing a fine job for us. Since using Wheelabrators, we have increased production 300%."

An Electric Mfg. Co.: "Our Wheelabrators are absolutely essential to our War Production Effort. Numerous parts used on Ship Propulsion Controls are cleaned on this machine, saving considerable time over previous methods."

A Large Bearing Mfg. Co.: "Your Wheelabrator equipment has increased production speed at our plant approximately 100% over previous methods and is very essential to our war production."

THE *Airless* WHEELABRATOR BRINGS YOU THESE *ADVANTAGES*

1. High-speed cleaning
2. Low cleaning cost
3. Reduces horsepower
4. Conserves space
5. Reduces breakage
6. Speeds up machining and grinding
7. Lengthens tool life
8. Simplifies inspection
9. Improves appearance
10. Provides perfect bond for final finishing
11. Insures accurate hardness tests

World's Largest Builders of Airless Blast Equipment

THE AMERICAN MOLDER

Trade Mark Reg. U. S. Pat. Off.

A Wisconsin Steel Foundry: "We would estimate that the production now going through out Wheelabrators is probably 4 to 6 times that which we would have been able to expect by previous methods. In some cases where we use the Wheelabrator instead of the tumbling barrels for cleaning, it far exceeds even that."

A Machinery Mfg. Co.: "We estimate Wheelabrator has increased our production from six to eight times over our previous method."

A Valve Mfg. Co.: "Our Wheelabrator has increased production speed over previous methods 200 to 300%."

A Motor Co.: "The Wheelabrator increased production 60%."

A Michigan Mfg. Co.: "Production has been increased over previous methods by at least 50% in cleaning."

A Steel Foundry in Wisconsin: "We estimate that the Wheelabrator has increased our production as much as 60% over previous methods."

An Ohio Foundry: "Wheelabrator speeds our work 22% and by its use we eliminate all sand and save our customers on expensive cutting tools."

A Foundry in Connecticut: "Wheelabrator has increased our production over previous methods at least 50% which is a very conservative estimate."

A Large Michigan Foundry: "Wheelabrator has increased production approximately 75%."

ECENTLY a U. S. battleship slid down the ways seven months ahead of schedule . . . a perb accomplishment! But it would not ve happened if materials and equipment d not arrived on time to meet the fast- oving construction schedule. The same is ue of all war production.

Since castings are so vitally important in e war effort . . . and since a big portion the nation's foundries use Wheelabrator eed-cleaning equipment . . . it might be lpful to you, in making future plans, if e value of this process in speeding up pro- ction were related by actual users engaged war work.

For that reason, we have asked a represen- tive group of customers to comment on is point. Quotations from typical replies e shown on these pages.

A Wisconsin Foundry: "With the Wheelabrator we can do same work in one-quarter of the time taken by other methods."

A New York Mfg. Co.: "Wheelabrators have reduced our cleaning time approximately 25% over sandblasting or pickling."

A Pennsylvania Steel Plant: "Since we have started o use Wheelabrators, in many cases our pro- luction has increased 100%, in other cases ve have no way of determining to what extent roduction is increased, as we have no ex- erience in using other methods. The reports rom other operations show increase in pro- luction from 75 to 80%."

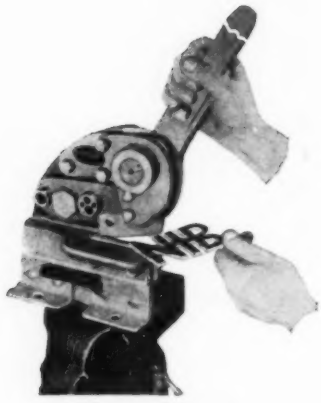
AMERICAN
FOUNDRY EQUIPMENT COMPANY

505 S. BYRKIT ST. · MISHAWAKA, IND.

FREEMAN EQUIPMENT

UNIQUIP ROUTER

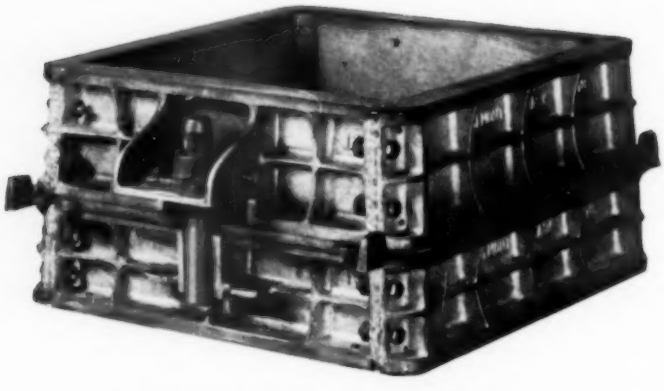
The UNIQUIP electric hand router one horsepower under load.



HANDNIB

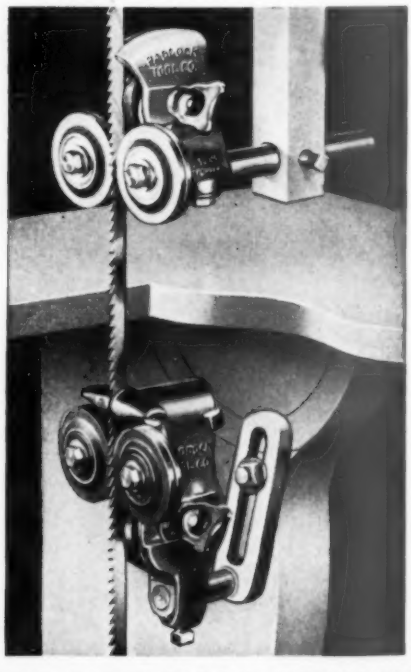
A Nibbler, a Shear and a Drill Rod Cutter. Three distinct operations with one tool.

Send for Special Complete Pamphlets



FREMONT FLASKS

Efficiency and long wear will increase your profits.



PADDOCK BALL BEARING BAND SAW GUIDES

Paddock Guides usually sell themselves in 10 minutes when installed.

THE FREEMAN SUPPLY COMPANY

Pattern Shop and Foundry Supplies and Equipment
Mahogany and Pine Lumber

1152 EAST BROADWAY **TOLEDO, OHIO**

Convention Offers Opportunity To Study Future Problems of Industry

AMERICA is winning the battle of production, and castings are making a major contribution to that success. In the 15 months since war was declared, the foundry industry has met every demand of the war production program. Through construction of new plants, expansion and modernization of foundry facilities, and the conversion of foundries to the production of those types of castings in greatest demand for the manufacture of war materiel, foundrymen have been able to render invaluable service to the cause of the United Nations.

A year ago we pointed out that to achieve victory, castings must be produced in much larger quantities for airplanes, tanks, ships, guns, shell, bombs, machine tools, railway cars, locomotives, trucks and every urgent requirement of war. This has been accomplished to an extent far beyond expectations. And in addition, the industry has made possible the new pipe lines from the Southwestern oil fields to the East coast, has undertaken a program of providing castings to replace forgings in many important installations, has continued to meet the ever expanding need for light alloy castings to be used in aircraft, and in general has shown great ability in solving every production problem.

To this important American industry now completing the greatest year in its history, the War Production Foundry Congress, to be held in St. Louis April 28, 29 and 30 in conjunction with the forty-seventh annual convention of the American Foundrymen's Association, provides a welcome opportunity to review tremendous technical developments, advancements in operating techniques and improvements in the tools of production, which have been born under the pressure of war demands. More important, perhaps, the gathering of managers, technicians and operating men at St. Louis creates the proper setting for some consideration of the multiplicity of problems that must be met in both the immediate and distant future.

Problems of the immediate future will be brought about through changes in types and quantities of castings needed for war, and will result from developments in military strategy based on knowledge gained in battle. Providing trained men and women in sufficient numbers to continue peak production will become more difficult, and the need for finding a solution to unexcused absenteeism has grown more pressing. Further in the future, the problems of returning to the manufacture of castings for civilian goods appear even more difficult than those which resulted from conversion to war.

To the officers and members of the American Foundrymen's Association, the St. Louis convention and War Production Congress marks the close of another year of important service to one of this nation's basic industries. Since the record breaking convention in Cleveland a year ago, the association membership has reached a record high, due in a great part to the growth and vitality of the chapter movement which now includes 23 active organizations. During the year, the board of directors established the Research Foundation and work on setting up that project now is under way. The cupola research program of the association has progressed remarkably during the past 12 months, as a result of the untiring efforts of many leading technical men of the industry and the money raising ability of a number of chapters, with the result that this important project now can move forward at an accelerated pace.

During the past year many chapters, under the guidance of the national office, have set up War Problems committees to assist members in solving the various production problems created by the present emergency. Recently the association has recognized the growing importance of aluminum and magnesium foundries in the field of castings and has sponsored the organization of the Light Alloy Division. Throughout the year the various technical committees of the A.F.A. have been most active, with the result that numerous reports and publications providing much information of value to the industry will be forthcoming.

As one of its important functions, the association has prepared an excellent program of technical meetings for presentation at the coming War Production Congress. Just as the Cleveland convention gave impetus to war production, participation in the St. Louis convention should aid individual foundrymen in meeting the many problems that lie ahead.

Frank G. Steinebach
Editor

St. Louis Foundry C

FOR the second successive year, problems related to the accelerated production dictated by war will highlight the Annual Convention of the American Foundrymen's Association, to be held at St. Louis, April 28 to 30. Program of the War Production Foundry Congress—as this year's meeting is termed—has been tailored to fit present conditions. It is intended to provide an opportunity for foundrymen to gather and exchange ideas that will be helpful in solving their particular problems and to become informed on the progress made throughout the foundry industry in the production of war materiel.

Host to the congress will be the St. Louis Chapter of the American Foundrymen's Association. This will be the first time St. Louis has been an A.F.A. convention site. Nine committees of the chapter are in charge of various arrangements for the gathering, headed by a general committee of which Louis J. Desparois, Pickands, Mather & Co., is chairman. Other officers of the supervisory group are: Vice Chairman, Webb L. Kammerer, Midvale Mining & Mfg. Co.; Secretary-Treasurer, John H. Williamson, M. A. Bell Co.

Chairmen of other committees include the following: Hotel committee, E. Eugene Ballard, National Bearing Metals Co.; Reception committee, Lloyd C. Farquhar, American Steel Foundries; Banquet committee, Luther Kleber, General Steel Castings Co.; Golf committee, Roy A. Jacobsen, Carondelet Foundry Co.; Publicity committee, J. W. Kelin, Federated Metals Division, American Smelting & Refining Co. Committee on Arrangements, Carl H. Morken, Carondelet Foundry Co.; Ladies committee, Mrs. C. B. Shanley. Photographs and names of various St. Louis Chapter committee members appear on pages 122 to 126 of this issue.

Entertainment arranged by the Ladies committee includes a reception and tea at Hotel Jefferson on Wednesday afternoon. A luncheon and card party, starting at 12:30 o'clock, will be given at the Chase Hotel Thursday afternoon, while the Friday program will consist of a luncheon and book review at the Merchants Athletic Association.

Technical sessions of the Congress have been limited to 3 days. Also in the interest of saving the time of busy foundrymen, the program has been arranged so that few of those in attendance need be away from their plants more than 2 days in order to participate in the meetings in which

...y Congress To Analyze WAR PRODUCTION PROBLEMS

they are interested. For instance, sessions on malleable iron and on aluminum and magnesium are scheduled for the first two days. Patternmakers will meet on the second day. Brass, bronze and steel castings practice will be discussed at meetings on the second and third days. Sessions on gray iron will be presented during the 3 days.

Subjects of general interest, such as apprentice and foreman training, job evaluation and time study, foundry costs, safety and hygiene, sand control and research, and refractories, are scheduled for meetings scattered throughout the program. In addition, several "off-the-record" sessions on vital war problems will be held.

Opening meeting of the congress will be held at 10:00 o'clock on Wednesday, April 28, with Duncan P. Forbes, president of the American Foundrymen's Association, and L. C. Wilson, vice president, presiding. In addition to President Forbes' annual report, this session will include a talk by Col. Merle H. Davis, chief, St. Louis Ordnance District, on "Trends in Use of Ordnance Items."

Officers Will Present Reports

Annual Business and Awards Meeting of the Congress, with President Forbes presiding, is scheduled for Thursday morning at 9:30 o'clock. Reports of officers of the association will be heard at this time, together with the report of election of officers and election of the 1944 nominating committee. Medals will be awarded at the meeting to Rufus F. Harrington, Carl F. Joseph and Stanley W. Brinson for their services to the foundry industry. Details regarding their citations will be found on page 127 of this issue. Concluding the program will be the first A.F.A. Foundation Lecture, presented by John W. Bolton, Lunkenheimer Co., Cincinnati, on the subject, "Foundry Metallurgy in the Castings Industry."

Among the special technical features offered at the Congress will be a series of lectures on gating and heading by W. G. Reichert, foundry consultant, Newark, N. J. Three sessions will be devoted to the subject, covering practices for various ferrous and nonferrous alloys. These lectures will be the first of a series on gating and heading which will be presented over a period of years and which eventually will be compiled into book form.

Shop courses relating to sand and gray iron—off-the-record discussions of practical foundry subjects presented in an understandable manner for the man in the shop—again occupy an important position in the technical program. These courses, which have been extremely popular since their inception, will be held each of the three evenings. Sand control in gray iron, steel, and magnesium foundries will be discussed at the sand sessions, while the gray iron meetings will feature presentation and discussion of sections of the *Cupola Operation Handbook* now being prepared by committees of the Cupola Research project. Some of the subjects to be covered are slags, fluxes and deoxidizers, carbon control, front slagging spouts, etc.

Among the special war problems to be considered during the congress is that of training women for industry. A talk on this subject will be given Wednesday evening at 8:00 o'clock by Miss Sara Southall, supervisor of employment, International Harvester Co., Chicago, and consultant, War Manpower Commission. Another war-inspired session will be a round-table discussion on "Explanation of Principles for Determining Costs Under Government Contracts," to be held Wednesday afternoon.

Personnel problems in general will have an important position on the program. Foreman training will be discussed at one session, and apprentice training at another. Job evaluation and time study as applied to the foundry will be the subject for a round-table to be held by the committee on that subject.

The Malleable division, under the chairmanship of A. M. Fulton, Northern Malleable Iron Co., St. Paul, will conduct a three-session symposium on melting practices, covering melting with all types of fuel now in use and in the various types of furnaces. A similar symposium on graphitization was held at the 1942 congress.

This year, for the first time, a complete program has been arranged for producers of light alloy castings. These sessions are sponsored by the newly organized Aluminum-Magnesium division of which Dr. N. E. Woldman, Eclipse Aviation Division, Bendix Avia- (*Please turn to page* 211)

Wednesday, April 28

8:30 a.m.—Registration—Hotel Jefferson

10:00 a.m.—Opening Session of Congress.

Presiding, D. P. Forbes, president, American Foundrymen's Association. Co-chairman, L. C. Wilson, vice president.

Annual President's Address

Trends in Use of Ordnance Items, by Col. Merle H. Davis, district chief, St. Louis Ordnance District.

12:30 p.m.—Malleable Division Round Table Luncheon.

Presiding, A. M. Fulton, Northern Malleable Iron Co., St. Paul; Co-chairman, R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

Discussion, *Information Please*.

Discussion Leader, J. H. Lansing, Malleable Founders Society.

2:00 p.m.—Aluminum and Magnesium Founding.

Presiding, Dr. N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J.

Recommended Practices for Magnesium Foundry Alloys, Committee report

Chemical Analyses of Sands for Magnesium Castings, by E. W. Cramer, State College, Mining Experiment Station, Pullman, Wash.

Temperatures Developed in Sand Cores During Casting of Magnesium Alloys, by A. T. Peters and M. V. Chamberlin, Dow Chemical Co.

2:00 p.m.—Molding and Coremaking.

Presiding, M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill.

Core Blowing, by Z. Madacey, Caterpillar Tractor Co., Peoria, Ill.

Application of Modern Controlled Methods To Produce Heavy Gray Iron Castings, by Samuel Appelby, Buffalo Foundry & Machine Co.

2:00 p.m.—Foundry Costs.

Presiding, R. L. Lee, Grede Foundries Inc., Milwaukee; Co-chairman, John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.

Explanation of Principles for Determining Costs under Government Contracts, round table discussion. Panel leaders, members of A.F.A. cost committee.

Report on Review of Recommendations to Buyers of Castings, by C. A. Davis, Caterpillar Tractor Co., Peoria, Ill.

4:00 p.m.—Heading and Gating Castings.

Lecture by W. G. Reichert, Newark, N. J., on *Aluminum and Magnesium Casting Practice*.

4:00 p.m.—Job Evaluation and Time Study.

Presiding, Frank Wartgow, American Steel Foundries, East Chicago, Ind.; Co-chairman, W. E. George, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Panel discussion of *Time Study and Job Evaluation as Applied to the Foundry*. Panel leaders: E. L. Berry, Link-Belt Co., Chicago; E. J. Metzger, Falcon Bronze Co., Youngstown, O.; L. W. Wallis, Trundle Engineering Co., Cleveland; J. A. Westover, Dyers Engineers Inc., Cleveland; R. J. Wieland, Forest City Foundry Co., Cleveland.

Job Methods Training, Training Within Industry Division, War Manpower Commission.

4:00 p.m.—Gray Iron.

Presiding, F. J. Walls, International Nickel Co., Detroit; Co-chairman, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

Cupola Combustion, by William Pennington, Mellon Institute.

The Effect of Heat Treatment on the Physical Properties of Some Common Irons Used in Oil Field Equipment, by E. R. Starkweather, Lufkin Foundry Co., Lufkin, Texas.

Review of Spanish Investigations of Gray Iron Metallurgy, by F. R. Morral, Pennsylvania State College, State College, Pa.

4:30 p.m.—Chapter Delegate Meeting.

Presiding, L. C. Wilson, vice president, American Foundrymen's Association; Co-chairman, R. J. Teetor, Cadillac Malleable Iron Co.

6:30 p.m.—Annual Dinner—Foundry Instructors.

Presiding, F. G. Sefing, International Nickel Co., New York.

Education and the Gray Iron Foundry, by W. W. Rose, executive vice president, Gray Iron Founders' Society, Cleveland.

6:30 p.m.—Annual Dinner—Chapter Officers and Directors.

Presiding, L. C. Wilson, vice president, American Foundrymen's Association; Co-chairman, R. J. Teetor, Cadillac Malleable Iron Co.

8:00 p.m.—Sand Shop Course.

Presiding, F. S. Brewster, Dow Chemical Co., Midland, Mich.

Foundry Sands for Magnesium and Aluminum Castings, by W. F. Rose, Wright Aeronautical Corp., Paterson, N. J.; A. E. Cartwright, Robert Mitchell Co. Ltd., Montreal, Que.; M. E. Gantz, American Magnesium Corp., Buffalo; F. S. Brewster, Dow Chemical Co.

8:00 p.m.—Gray Iron Shop Control.

Presiding, Kenneth Priestly, Eaton Mfg. Co., Vassar, Mich.; Co-chairman, E. E. Marbaker, Mellon Institute, Pittsburgh.

Slags, Fluxes and Desulphurizers

Discussion Leader, George S. Evans, Mathieson Alkali Works.

8:00 p.m.—Special War Problems.

Presiding, W. J. Hebard, director of personnel, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Training Women for Industry, by Miss Sara Southall, supervisor of employment, International Harvester Co., Chicago, and consultant, War Manpower Commission.

Thursday, April 29

9:30 a.m.—Business and Awards Meeting.

Presiding, D. P. Forbes, president, A.F.A., Gunite Foundries, Rockford, Ill.; Co-chairman, L. C. Wilson, vice president, A.F.A., Reading Steel Castings Division, American Chain & Cable Co., Reading, Pa.

Report of Officers; Report of Election of Officers; Election of 1944 Nominating Committee; Medal Awards.

First A.F.A. Foundation Lecture, *Foundry Metallurgy in the Castings Industry*, by John W. Bolton, Lunkenheimer Co., Cincinnati.

12:30 p.m.—Aluminum, Magnesium Round Table Meeting.

Presiding, Dr. N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., Co-chairman, Leslie Brown, Magnesium Fabricators, Adrian, Mich.

Discussion Leaders, A. T. Ruppe, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.; G. H. Starmann, Apex Smelting Co., Chicago.

Fire Prevention and Control in Magnesium Foundries, by R. I. Thrune, Dow Chemical Co., Midland, Mich.

2:00 p.m.—Malleable Foundry Melting Symposium (Section 1)

Presiding, President D. P. Forbes, A.F.A.; Co-chairman, Carl F. Joseph, Saginaw Malleable Iron Division, General Motors Corp.

Introduction, by Dr. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland

Air Furnace, Pulverized Coal Fired, by I. A. Durr, Eastern Malleable Iron Co., Naugatuck, Conn.

Melting with Fuel Oil in the Air Furnace, by A. Van Lantschoot, Iowa Malleable Iron Co., Fairfield, Iowa.

2:00 p.m.—Patternmaking.

Presiding, Vaughan Reid, City Pattern Works, Detroit; Co-chairman, Frank C. Cech, Cleveland Trade School, Cleveland.

Job Analysis and Predetermine of Time Values for Patternmaking, by W. D. Walters, supervisor of time study, Feeder Division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Insurance Protection of Patterns, by W. C. Anderson, Missouri Inspection Bureau, St. Louis.

Metallizing as a Pattern Tool, by E. T. Parkinson, Metallizing Co., Chicago.

Report on Pattern Coatings.

2:00 p.m.—Steel Castings.

Presiding, R. A. Gezelius, General Steel Castings Corp.; Co-chairman, John Howe Hall, General Steel Castings Corp., Eddystone, Pa.

Heat Treatment of Medium Carbon Cast Steel in Moderately Heavy Sections, by K. L. Clark, H. F. Bishop and H. F. Taylor, Naval Research Laboratory, Anacostia Station, Washington.

Quantity Production of Manganese Steel, by I. W. Gardom, Sheffield, England, Exchange Paper of Institute of British Foundrymen.

Report of Committee on Radiography, presented by C. W. Briggs, Steel Founders Society of America, Cleveland.

2:00 p.m.—Gray Iron Symposium (Section 1).

Presiding, Dr. A. E. Schuh, U. S. Pipe & Foundry Co., Burlington, N. J., and War Metallurgy Committee, National Research Council, Washington; Co-chairman, T. E. Barlow, Vanadium Corp. of America, Detroit.

Introduction of Symposium, by R. G. McElwee, Vanadium Corp. of America, Detroit, and War Production Board, Washington.

Report of Survey of High Temperature Properties and Applications, by T. E. Barlow, War Metallurgy Committee, and Vanadium Corp. of America, Detroit.

Heat Treatment of Cast Iron, by J. S. Vanick, International Nickel Co.

4:00 p.m.—Heading and Gating Castings.

Lecture by W. G. Reichert, *Heading Iron Castings*.

4:00 p.m.—Brass and Bronze Founding.

Presiding, William Romanoff, H. Kramer & Co., Chicago; Co-chairman, W. W. Edens, Ampco Metals Inc., Milwaukee.

Recommended Practice for Manganese Bronze, committee report.

Effect of Lead on Some of the Mechanical Properties of Manganese Bronze, by George Halliwell, H. Kramer & Co., Chicago.

Lead in Manganese Bronze, by A. H. Hesse, Naval Research Laboratory, Anacostia Station, Washington.

4:00 p.m.—Malleable Foundry Melting Symposium (Section 2).

Presiding, Dr. H. A. Schwartz, National Malleable & Steel Castings, Cleveland; Co-chairman, R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis.

Air Furnace—Cupola Duplexing, by F. J. Wurscher, Acme Steel & Malleable Co., Buffalo.

Cupola—Electric Duplexing, by Charles Morrison, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.

Cupola Melting for Malleable Fittings, by H. W. Maack, Crane Co.

Open Hearth Melting, by Leo J. Kelly, Fort Pitt Malleable Iron Co., Pittsburgh.

Program for the FOUNDRY WAR PRODUCTION CONGRESS

6:30 p.m.—Foundry Foremen Training Group—Dinner.

8:00 p.m.—Foreman Training.

Presiding, W. G. Conner Jr., Walworth Co., Kewanee, Ill.; Co-chairman, W. E. George, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Panel Discussion, Foreman Training.

Job Relations Training, Training Within Industry Division, War Manpower Commission.

8:00 p.m.—Sand Control Shop Course.

Presiding, E. E. Woodliff, Detroit.

Cement Molding Practices in a Gray Iron Shop, by C. Sleicher, New England Butt Co., Providence, R. I.

8:00 p.m.—Gray Iron Shop Course.

Presiding, P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.; Co-chairman, E. E. Marbaker, Mellon Institute, Pittsburgh.

Carbon Control of Cupola Cast Iron.

Discussion Leader, H. Kenneth Briggs, Miller & Co., Chicago.

Front Slagging Spout for Cupolas, by R. D. Fetcher, Weil-McLain Co., Michigan City, Ind.

8:00 p.m.—Malleable Foundry Melting Symposium (Section 3).

Presiding, C. F. Joseph, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.; Co-chairman, J. H. Lansing, Malleable Founders' Society, Cleveland.

Bracklesburg Furnace Melting, by W. Zeunik and Kenneth Mason, National Malleable & Steel Castings Co., Indianapolis.

Refractories Practices for Malleable Furnaces, by C. A. Brashares, Harbison-Walker Refractories Co., Pittsburgh.

Practical Points in Malleable Melting, by J. H. Lansing, Malleable Founders' Society, Cleveland.

8:00 p.m.—Aluminum and Magnesium Castings.

Presiding, Dr. N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J.

Recommended Practice for Sand Cast Aluminum Alloys, committee report presented by H. J. Rowe, Aluminum Co. of America.

Fluoroscopic Examination of Light Alloy Castings, by A. E. Cartwright, Robert Mitchell Co. Ltd., Montreal, Que.

Recent Improvements in Magnesium Melting and Aluminum Ladle Preheating Practice, by James Kniveton, Selas Co., Philadelphia.

8:00 p.m.—Steel Castings.

Cores for Steel Castings, by J. A. Duma and S. W. Brinson, Norfolk Navy Yard, Portsmouth, Va.

Converter Practice, by F. B. Skeates, Link-Belt Co., Chicago, and A. W. Gregg, Whiting Corp., Harvey, Ill.

Friday, April 30

10:00 a.m.—Steel Castings.

Presiding, C. E. Sims, Battelle Memorial Institute, Columbus, O.; Co-chairman, C. W. Briggs, Steel Founders' Society of America.

Use of Aluminum in 1000 Steel Heats, by E. C. Troy, Dodge Steel Co., Philadelphia.

Report of Committee on Non-Destructive Testing, presented by Committee Chairman R. A. Gezelius, General Steel Castings Co., Eddystone, Pa.

Report of Committee on Methods of Producing Steel for Castings, presented by C. E. Sims, Battelle Memorial Institute.

10:00 a.m.—Brass and Bronze.

Presiding, H. M. St. John, Crane Co., Chicago.

Recommended Practices for Aluminum Bronze, committee report, presented by A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee.

Recommended Practices for Silicon Bronzes committee report, presented by E. G. Jennings.

Centrifugal Castings of Brass and Bronze, by H. Zuehlke, Allis-Chalmers Mfg. Co., Milwaukee.

10:00 a.m.—Apprentice Training.

Presiding, C. J. Freund, dean of engineering, University of Detroit.

The Second Generation in Apprentice Training, by Richard Falk, Falk Corp., Milwaukee.

Getting Results from Accelerated Training, by W. J. Hebard, Continental Roll & Steel Foundry Co., East Chicago, Ind.

10:00 a.m.—Sand Research.

Presiding, J. B. Caine, Sawbrook Steel Castings Co., Lockland, O.; Co-chairman, Dr. H. Ries, Ithaca, N. Y.

Elevated Temperature Studies of Foundry Cores and Coremaking Materials, by C. P. Albus and Emile Pragoff Jr., Hercules Powder Co.

Southern Bentonite in the Steel Foundry, by N. J. Dunbeck, Eastern Clay Products Co., Eifort, O.

Causes of Burned-in Sand Condition of Steel Castings, by J. B. Caine, Sawbrook Steel Castings Co., Lockland, O.

10:00 a.m.—Gray Iron Symposium (Section 2).

Presiding, V. A. Crosby, Climax-Molybdenum Co., Detroit; Co-chairman, George A. Timmons, Climax Molybdenum Co., Detroit.

Modulus of Elasticity, by A. J. Herzig, Climax Molybdenum Co., Detroit.

Impact Properties, by Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.

Endurance Limits, by C. J. Tobin, General Motors Research Laboratories, Detroit.

Vibration Dampening, by F. J. Walls, International Nickel Co.

12:30 p.m.—Steel Division Round Table Luncheon.

Presiding, T. D. West, Deere & Co., Moline, Ill.

Atmospheric Pressures in Blind Feed Risers; Chairman, R. S. Munson, Atlantic Steel Casting Co., Chester, Pa.;
Discussion Leader, H. D. Phillips, Lebanon Steel Foundry Co.

Some "Good and Bad Castings"; Chairman, A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn.;
Discussion Leader, S. W. Brinson, Norfolk Navy Yard, Portsmouth.

Miscellaneous Topics;
Discussion Leaders, John Howe Hall, General Steel Castings Corp., Eddystone, Pa.; G. A. Lillieqvist, American Steel Foundries.

12:30 p.m.—Brass and Bronze Division Round Table Luncheon.

Presiding, B. A. Miller, Cramp Brass & Iron Foundries Division, Baldwin Locomotive Co., Philadelphia.

Recommended Practice for Temperature Control, by D. Frank O'Connor, Walworth Co., Greensburg, Pa.

12:30 p.m.—Apprentice Committee Meeting and Luncheon.

2:00 p.m.—Safety and Hygiene Section.

Presiding, James R. Allan, International Harvester Co., Chicago.

Fumes and Dust, discussion by Dr. E. M. Adams, Dow Chemical Co.

Mechanical Exhaustion of Fumes and Smoke, the Engineering Aspects of Collection of Dust and Fumes in Nonferrous Foundries and Industrial Operations, by John Kane, American Air Filter Co., Louisville, Ky.

Safety and Hygiene Problems in Aluminum and Magnesium Foundries, by Warren Cook, Zurich General Accident & Liability Insurance Co.

Open Question and Answer Period—Occupational Disease Problems.

2:00 p.m.—Foundry Refractories.

Presiding, J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.; Co-chairman, John Lowe, Battelle Memorial Institute.

Conservation of Foundry Refractories, by F. McCarthy and C. E. Bales, Ironton Fire Brick Co., Ironton, O.

Electric Furnace Refractories, by E. K. Pryor, Charles Taylor & Sons, Cincinnati.

Report of Cupola Refractories, committee of Cupola Research Project.

2:00 p.m.—Gray Iron Symposium (Section 3).

Presiding, John W. Bolton, Lunkenheimer Co., Cincinnati; Co-chairman, John Lowe, Battelle Memorial Institute, Columbus, O.

Relation of Microstructure to Properties, by W. E. Mahin, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Compression and Torsion Properties, by F. G. Sefing and J. S. Vanick, International Nickel Co., New York.

Wear Resistance, by Paul Lane, Muskegon Piston Ring Co.

Transverse and Tension Strength and Deflection, by F. G. Walls, International Nickel Co., Detroit.

Closure of Symposium, by R. G. McElwee, Vanadium Corp. of America, Detroit.

4:00 p.m.—Heading and Gating Castings.

Lecturer, W. G. Reichert, Newark, N. J.

4:00 p.m.—Plant and Plant Equipment.

Presiding, James Thomson, Continental Roll & Steel Foundry Co.

Infra Red Lamp Drying of Cores and Molds, Symposium with papers by: L. M. Duryee, Connecticut Light & Power Co., Waterbury, Conn.; E. H. Robinson, Lamp Department, Nela Park Engineering Department, General Electric Co., Cleveland.

Core Sand Reclamation at Elevated Temperatures, by D. Longeuville, Wright Aeronautical Corp., Cincinnati, and W. L. Hartley, Link-Belt Co., Chicago.

Discussion of Steel Foundry Maintenance in Wartime.

4:00 p.m.—Steel Foundry Practice.

Presiding, F. A. Melmoth, Detroit Steel Castings Co., Detroit; Co-chairman, L. C. Farquhar, American Steel Foundries, East St. Louis, Ill.

Stress Relief and the Steel Casting, by H. F. Taylor and E. Rominski, Naval Research Laboratory, Anacostia Station, Washington.

Hydrogen and Nitrogen as Causes of Gasiness in Ferrous Castings, by C. A. Zapffe and C. E. Sims, Battelle Memorial Institute.

Factors Influencing Ductility in Cast Steel, by G. A. Timmons, Climax Molybdenum Co., Detroit.

7:00 p.m.—Annual Dinner.

Presiding, Duncan P. Forbes, president, A.F.A.

Address by Gov. Dwight Griswold of Nebraska.

7:00 p.m.—Shop Sand Control.

Presiding, F. B. Riggan, Key Co., East St. Louis, Ill.

Steel Shop Sand Control.

7:00 p.m.—Gray Iron Shop Control.

Presiding, H. H. Wilder, Washington.

Cupola Operation

Discussion Leader, E. E. Marbaker, Mellon Institute, Pittsburgh.

St. Louis District Chapter Committee Members

C. B. Shanley

Luther Kleber

J. H. Williamson

L. J. Desparois

W. L. Kammerer

E. E. Ballard

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Semi-Steel Casting Co.
Luther Kleber, *Vice Chairman*
General Steel Casting Co., Granite City, Ill.
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Carondelet Foundry Co.
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Griffin Wheel Co., Kansas City, Kans.
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A.F.A Makes Awards for Contributions to The Foundry Industry

Rufus F. Harrington

THREE foundrymen will be especially honored at the 47th Annual Convention and War Production Foundry Congress of the American Foundrymen's Association in St. Louis, April 28 to 30. Two gold medals and a life membership in the association will be presented to these men in recognition of their outstanding contributions to advancement of the foundry industry. Formal awards will be made at the annual business meeting to be held at 9:30 a. m., Friday April 29.

RUFUS F. HARRINGTON, foundry superintendent, Hunt-Spiller Mfg. Co., Boston, will receive the John A. Penton Gold Medal of the association "for outstanding pioneering work in foundry sand control."

CARL F. JOSEPH, research metallurgist, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., will be the recipient of the William H. McFadden Gold Medal of the association "for his outstanding metallurgical and shop practice contributions to the foundry industry, especially the malleable iron section."

STANLEY W. BRINSON, master molder, Norfolk Navy Yard, Portsmouth, Va., will receive an honorary life membership in A.F.A. "for his valuable contributions to the Association and the foundry industry."

Selection of these men was made by the board of awards of the association, consisting of the last seven living past presidents. The board includes: H. S. Simpson, National Engineering Co., Chicago; Lester N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala.; Henry S. Washburn, Plainville Castings Co., Plainville, Conn.; Marshall Post, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; Hyman Bornstein, Deere & Co., Moline, Ill.; James L. Wick Jr., Falcon Bronze Co., Youngstown, O.; and Dan M. Avey, Tulsa, Okla.

Carl F. Joseph

RUFUS F. HARRINGTON entered the foundry industry in 1913 upon being graduated from Tufts College, Boston, with a bachelor of science degree. Starting as a chemist with his present company, he served successively as chemist in charge of laboratories, metallurgist in charge of metallurgical operations, testing of materials, and sand research and conservation until 1938. In that year, he was made foundry superintendent and chief metallurgist, but subsequently he relinquished the latter duties with the inauguration of a steel foundry division of the company and was placed in charge of both the iron and steel foundries.

Mr. Harrington was a member of the original joint committee of the National Research Council and the American Foundrymen's Association which in 1921 inaugurated the sand research program which has been carried on by the association ever since. He also has served on many other committees and subcommittees of the foundry sand research committee and has been a member of its executive committee. His interest in sand research and other activities of the association, and the numerous papers on a variety of subjects which he presented at its meetings, led to his selection as a director of (*Please turn to page* 209)

Stanley W. Brinson

Women AT WORK in the Foundry

By JOHN. H. CALDWELL
Associate Editor, The Foundry
New York

AS A RESULT of constant drainage of American manpower into the armed forces, war production plants now are training women for work hitherto performed only by men. The Bendix Aviation Corp. about four months ago turned to hiring women for heavy as well as light jobs. Now, about 10 per cent of the foundry crew at the Bendix, N. J. plant are women. These women are performing numerous types of jobs in the aluminum, magnesium and bronze foundries of the Bendix Co.

They first were brought into the foundries as apprentice coremakers. Now they are doing coremaking, core assembling, buffing, airless abrasive blasting, melt marking, heat treat control, burring, dichromating, water testing, inspection and stock chasing. These women work in the same crews and departments as the men. They learn their jobs quickly, are interested in the work they are doing and work on all three shifts. Some women, due to home conditions, prefer to work the night shift.

The great expansion in the Bendix foundries has come about over a period of several years. However, the greatest activity has taken place within the past four months. Many of the employes were young men and consequently a great many of them have gone into military service. Others no doubt will be going in the future. Therefore, the only solution to the problem was employment of women. Through local newspaper advertising and by word of mouth in the plant, the news was spread that Bendix would train women to take over foundry jobs. Response was (*Please turn to page* 210)

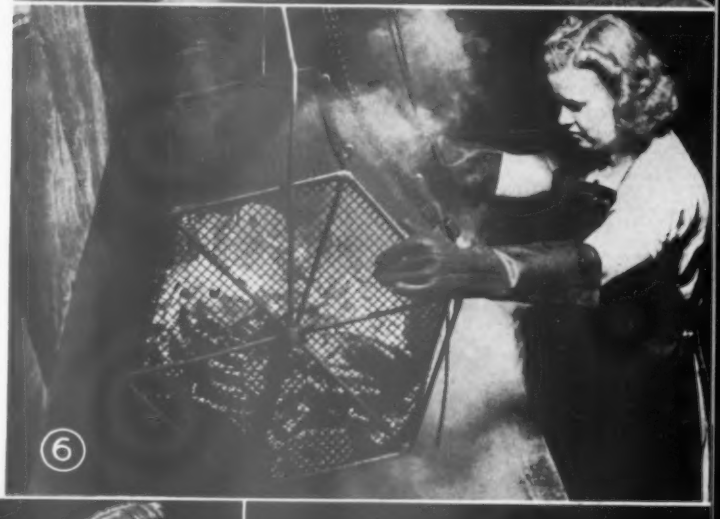


Fig. 1—Applying water and air pressure to determine soundness of sump pump. Fig. 2—Buffing magnesium castings to obtain a smooth surface. Dust is caught in oil as a safety protection. Fig. 3—Drying a core with a torch after cleaning and assembling the halves which are pasted together. Fig. 4—Making and slicking cores. Due to hand dexterity required, women soon become proficient in those operations. Fig. 5—Women make good inspectors and this shows the final inspection before shipping. Fig. 6—All magnesium castings are treated with a dichromate solution for protection against corrosion. Fig. 7—Operating an airless abrasive blast machine. Fig. 8—Making a chemical determination. Fig. 9—All rough and irregular edges are burred with rotary air tools

CASTS STEEL Centrifugally

By C. K. DONOHO
Metallurgist
American Cast Iron Pipe Co.
Birmingham, Ala.

CASTING metal into spinning cylindrical molds is common practice in the mass production of cast iron pressure pipe. Both the sand-lined mold and metal mold processes have been in successful commercial use for the past 20 years. Consistently good physical properties are obtained by virtue of centrifugal casting and this has resulted in a reduction in the required thicknesses and weight of pipe for a given service.

Alloy steel gun barrels are cast centrifugally in horizontal metal molds by a process developed over a long period of years at Watertown Arsenal. Tubular castings of various high alloy steels as well as nonferrous metals are being produced in a number of foundries very successfully by horizontal centrifugal casting both in metal and in sandlined molds. Such parts as wheels and gears are cast centrifugally but usually by spinning about a vertical axis.

From a paper presented at the annual meeting of the Steel Founders' Society of America held at the Edgewater Beach Hotel, Chicago, on Feb. 10 and 11.

For several years there has been a gradual but continuous increase in the use of the centrifugal casting methods for producing high quality castings. The present emergency has given a sharp impetus to the centrifugal casting of steel, not only as an improvement on static casting methods for steel castings but also as a method of producing engineering parts of cast steel directly from molten metal which formerly could be made only from forgings, which involves the pouring of the ingot, passage through successive stages of the rolling mill, and finally the rough forming of the desired part.

All centrifugal casting is in effect pressure casting, in

Fig. 1—Bogie wheel hub castings. Fig. 2—Idler hub castings. Note cored larger inside diameters. Fig. 3—Ship shaft castings. Fig. 4—Close up of pouring. Fig. 5—Vertical axis centrifugal casting showing actual paraboloidal cavity compared with calculated cavity. Fig. 6—Pouring steel through an orifice trough into the spinning mold

that the molten metal is forced against the mold wall under relatively high pressure, compared to the usual gravity head in static casting. This confers the advantages of better feeding, elimination or reduction of shrinkage cavities and gas pockets, and denser metal. Pressure as applied by centrifugal force differs from that applied by other pressure casting methods in that it is selective in its action, the heavier components being thrown outward with greater force than the lighter particles. This helps to eliminate light nonmetallics by flotation inward toward the axis of the rotating molds.

When a mold containing molten metal is spinning about any axis other than the horizontal, the resulting interior cavity is a paraboloid as shown in Fig. 5, whose shape and dimensions depend upon: Spinning speed, maximum diameter at the top of the cavity, and the angle of inclination of the axis of revolution. When these three factors are known, the cavity—except as modified by shrinkage and

Fig. 7—Weighing steel for one cylinder barrel casting. Fig. 8—Battery of 72 horizontal spinner heads for metal mold casting of cylinder barrels. Fig. 9—Cylinder barrel castings. Fig. 10—Pouring weighed amount of steel into spinning mold

piping—is exactly determined and may be calculated by mathematical formulae.

Centrifugal casting with axis vertical is used commercially for casting articles which are generally disk or wheel shaped with a hole in the center. A section through the paraboloidal cavity at the axis of the casting carrying most of the shrinkage and non-metallic inclusions, is usually bored out in finishing. In another method of using centrifugal force about a vertical axis, molds for several castings are spaced near the perimeter of the spinning flask. The metal is poured into a down-gate at the axis and fed into the separate castings through radial gates.

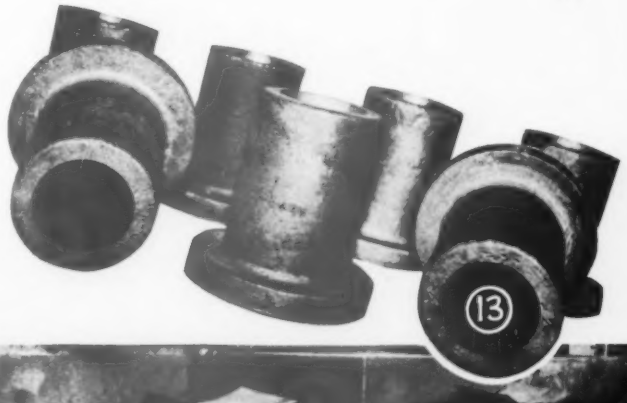
When a mold is spun about a horizontal axis the interior cavity formed by the molten metal is perfectly cylindrical and is determined exactly by the mold dimensions and the volume of metal poured. This method is preferable for casting parts which are generally cylindrical in shape or at least cylindrical interiorly. In vertical centrifugal casting, pouring heads often are used to feed the

metal into the axis of the spinning mold, and sometimes gates carry the metal from the axis to heavy sections along the perimeter. In horizontal centrifugal casting it is customary to pour a weighed amount of metal entirely into the mold itself so that yields of 90 per cent or greater may be attained.

In making a casting with a cylindrical bore by the horizontal centrifugal method, the core for the inside is, of course, entirely eliminated, with attendant saving in time and labor. However, if more than one inside diameter is required, the larger diameters may be formed by cores extending from the ends of the mold leaving the smallest cylindrical diameter to be formed by centrifugal force.

For true centrifugal castings, as produced by the horizontal method, inspection problems have been found to be simplified greatly. In static steel castings a large proportion of the critical defects are subsurface imperfections detectable only by radiographic or other expensive and time consuming methods. In centrifugal castings such de-

Fig. 11—Extracting the solidified casting. Fig. 12—Weighing the steel for one ship shaft casting. Fig. 13—Weld neck casting. Fig. 14—Molds ready for cleaning and reassembly



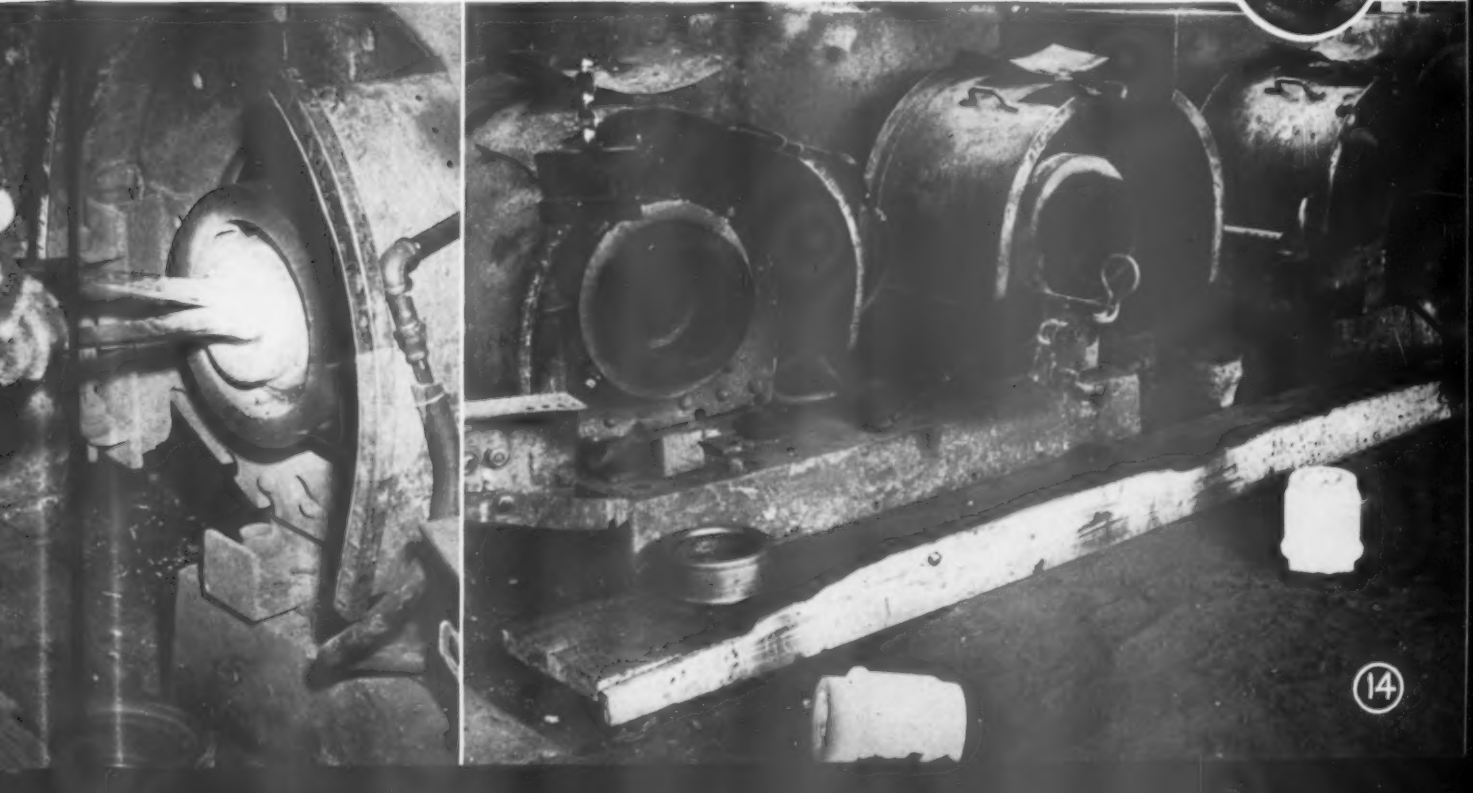


Table I

Castings Made by Spinning About Horizontal Axis

No.	Casting	Max. O.D.	Min. I.D.	Total Length	Casting Wt. Lbs.	Steel Type	Mold Type	Pour Time Sec.	Mold RPM
1.	Bogie Wheel Hub	5″	3⅜″	10″	30	SAE 1030	Metal	9	950
2.	Ship Shaft	16″ Flg., 9″ Body	4½″	16′	2500	SAE 1030	Sand	90	1100
3.	Retort Tubing	12¼″	10″	16′	2200	28-15 Stainless	Sand	90	700
4.	Hawse Pipe Tubing	21.8	20″	16′	3500	SAE 1030	Sand	45	525
5.	Cylinder Barrel	7″	4¼″	9¼″	40	SAE 4140	Metal	11	975
6.	Cylinder Barrel	8⅝″	5¼″	11¾″	75	Nitralloy	Metal	15	900
7.	Cylinder Barrel	9″	5⅜″	12″	110	SAE 4140	Metal	20	850
8.	Idler Hub	9″	5⅜″	9½″	62	SAE 1030	Sand	12	800
9.	Flanged Weld Neck	16″ Flg.	4″	11″	300	SAE 1030	Sand	24	1100
10.	Flanged Weld Neck	11¾″	5″	13″	150	SAE 1030	Sand	15	1000

fects as are found are in nearly all cases at the inside or outside surface of the casting and thus more readily detectable.

Briefly, the chief advantages of centrifugal steel castings are sounder, denser, cleaner castings, higher yields, elimination of cores, and simplified inspection. Disadvantages are limitations as to sizes and shapes adaptable to the process, the expense of installing and maintaining spinning machines, the increased difficulty of changing equipment to make a variety of castings as in jobbing work.

The centrifugal process is best adapted to the mass production of large quantities of identical castings and since this is also one of the conditions which make "permanent mold" processes economical, it is not surprising to find the two processes combined in many instances. The choice of the mold type whether metal or sand depends upon a number of factors which must be considered before tooling up to make a new type of casting. In general, the conditions favorable to the use of metal molds are: (1) Where a very large quantity of identical castings are to be made. (2) Where the outside contour of the casting is simple enough so that it can be readily slipped out of the mold. (3) where a fast cooling rate from the outside inward, with attendant fine grain is desirable.

Centrifugal casting in sand lined molds is preferred: (1) Where the metal must flow relatively long distance over the mold surface. (2) Where the shape of the casting is such that the mold must be broken down in order to remove the solid casting. (3) Where it is essential to be able to vary the dimensions and shape of similar castings. (4) Where a relatively uniform cooling rate through a thick section is desirable.

Spinning speeds for horizontal castings, of course, vary with the size and type of casting. For sand-lined molds, a general rule is to use a spinning speed which will give a centrifugal force of about 75 times gravity. A simple formula derived from the centrifugal force formulae to give the spinning speed for a centrifugal force of 75 pounds per pound of metal is:

$$N = \frac{1675}{\sqrt{R}}$$

Where N = revolutions per minute and R = radius in inches. Substitutions in the formula indicate that a piece of 6 inch diameter should be spun at 967 revolutions per minute while a part 12 inches in diameter should be spun at 684 revolutions per minute.

Spinning speeds at or near the "favorable" revolutions per minute, as calculated by the above formula, generally have been found best, particularly for the initial spinning speed during pouring. Although a centrifugal force just sufficient to overcome gravity will theoretically hold the metal on the wall of the mold the higher force is desirable to squeeze out slag particles and lighter non-metallics. Also with speeds much less than the speed to give a force of 75 times gravity the metal (*Please turn to page* 221)

Fig. 15—*Ramming a* 16-*foot long sand mold for tubular casting.* *Fig.* 16—*Hawse pipe tubes cast centrifugally with flanges welded on*

Plant Safety AND Foundry Manpower

By THOMAS DREVER
President, American Steel Foundries
Member, Executive Committee
War Production Fund To Conserve Manpower

CONSERVATION of foundry manpower through high safety standards is one of the industry's chief wartime concerns. Losses in production and morale are the sure penalty of a relaxed accident-prevention program.

All industry is emphasizing the theme of saving manpower for warpower. The sentiment, in fact, has grown into a powerful safety movement, highly organized, effective off as well as on the job, and supported by people in all walks of life, public and private. In war production areas—through the untiring offices of William A. Irvin, national chairman of the War Production Fund, and of Col. John Stilwell, president of the National Safety Council—accident-prevention is becoming accepted as an active community responsibility shared by all.

Scarcely a day passes that some responsible industrialist does not come out flatly for a strengthening of American safety disciplines. Late in the fall of 1941, talking before the National Safety Congress, Tom M. Girdler of Republic Steel Corp. and Consolidated Aircraft Corp. pretty well summed up the situation as industry sees it.

"Employers have had to train these new men, often from scratch," said Mr. Girdler, speaking of the influx of green hands into manufacturing plants. "It has been necessary to fit thousands upon thousands of workers in record-breaking time to handle unfamiliar jobs. That has been one of industry's most amazing achievements of the emergency."

"In these training programs," Mr. Girdler continued, "there has been of course no intentional neglect of the safety factor. But the very speed of the process, the tremendous pressure for top production, the unavoidable dilution of supervision, the congestion of plants—all these have combined to bring some increase in industrial accidents."

"Because of this fact, industry has been confronted with the most serious safety problem of many years," Mr. Girdler concluded. "In attacking this problem it is indeed fortunate that industry has a safety program well seasoned and long established."

Business and industry have taken the initiative in stiffening the national safety program to bear up under war pressures. A majority are not hesitating to support with money, time and close co-operation a movement that, to be effective, must flourish not only in the plant proper, but off the job—in the home and on the highway, where, it is seldom appreciated, three out of five accidents actually happen.

Through the War Production Fund to Conserve Manpower, business and industry are financing an all-out war on accidents, by corollary on manpower losses entailed. Contributions are being put to work under the direction of the 31-year-old National Safety Council. This institution, known to industry for its nonprofit services rendered on a pro rata basis, for its education material and technical and organizational assistance in the safety field, has been officially chosen by the President to spearhead the movement.

Mr. Irvin, Fund national chairman, is former president of the United States Steel Corp. So serious is his concern about the accident factor as a retarding element in production that he is devoting the major part of his time to crusading for all-around safety. Accompanied by Col. Stilwell, council president, likewise on leave from his duties as vice-president of New York Consolidated Edison, Mr. Irvin has just made a 9000 mile tour. In St. Louis, Chicago, Minneapolis, St. Paul, Seattle, Portland, San Francisco, Los Angeles, San Diego, Dallas, Ft. Worth, Houston and New Orleans he has warned the home front of the accumulative ill effects of the American accident-experience.

In these same key centers he has offered plans for joint counter-attack by council and community. The response has been genuinely enthusiastic. No one can doubt America's awareness of the need for more wartime accident-prevention, or the Nation's eagerness to accept responsibility competently assigned. This, I am glad to note, is actually being done by the National Safety Council, directly and through an amazing network of co-operative arrangements with public and private groups.

Meanwhile it behooves all of us who are turning out the goods to win this war of metals to review our specific responsibilities in accident-prevention. We cannot scan too often the familiar hazards within our own field.

Steel foundries, I am glad to say, can take stock of their safety programs with a few misgivings. We all know the relentless struggle that steel as a whole has waged against accidents. Steelmaking and steel foundry work once had the reputation of being extremely dangerous occupations. Today they are demonstrably (*Please turn to page* 212)

PACKARD

Fig. 1—Setting and assembling cores for wheel case. No flask is used, the core assembly being taken directly to the foundry and poured. Fig. 2—Core-blowing machines with operator preparing half of core box. Finished pump cores shown at the left. Fig. 3—Skimming dross from 30,000-pound remelt furnace. Pig mold conveyor is at floor level at the right. Fig. 4—Fluxing 1000-pound heat of aluminum by bubbling chlorine gas from submerged nozzle. Solid fluxes are used also

RD CONVERTS TO Aluminum Castings Production

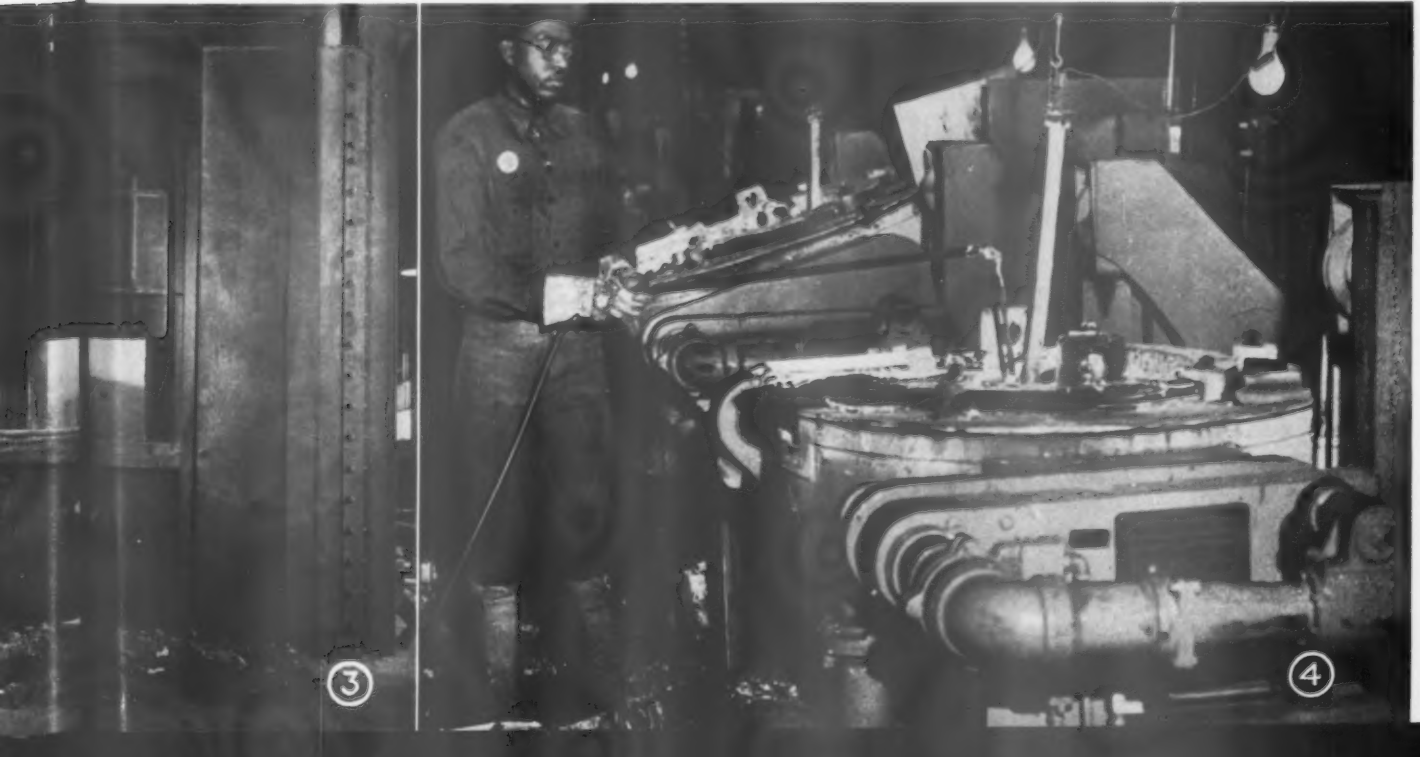
By A. H. ALLEN
Detroit Editor
THE FOUNDRY

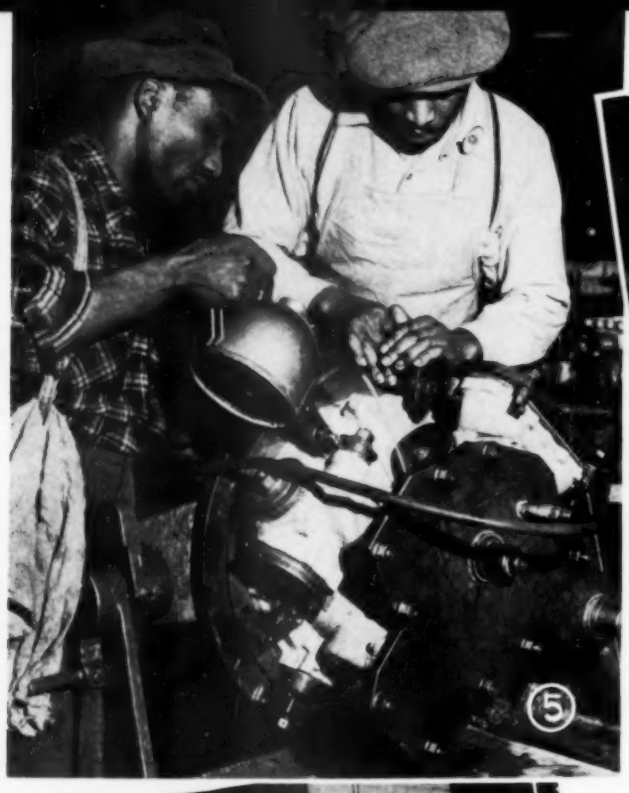
EFFICIENT job of conversion from iron to aluminum castings manufacture has been accomplished at the Packard Motor Car Co. foundry, Detroit, and production is now well along toward a goal of approximately 30,000 pounds of finished castings daily. The gray iron foundry poured its last casting Feb. 28, 1942, and for several months the foundry and its staff were really "on their uppers." But when the go-signal on aluminum was received last summer, conversion activity started to hum, and the first light metal castings were poured in September.

Castings produced in the refurbished foundry are for use in the Packard marine engine and in the Rolls-Royce aircraft engine which the company is building for the British and the Army Air Forces. Size of the Rolls-Royce contract has been expanded considerably since it was first undertaken, and Packard right now is in process of doubling the rate on which operations have been based in recent months. This is one of the reasons why the additional foundry facilities were required, but even with them it will not be possible to keep up with additional demand for castings, in spite of the fact several outside castings sources have been furnishing aluminum parts before the Packard capacity was brought in.

In speaking of aluminum castings, it is important to differentiate between finished castings and the amount of metal poured daily, since the yield on some large and intricate castings is quite low. This is because of the numerous and large gates and risers which are necessary to prevent shrink holes in the castings. Packard foundry engineers, under direction of O. F. Carpenter, foundry superintendent, have been digging into this matter of yield, with good results. Several of the castings jobs undertaken have been improved considerably from the standpoint of yield, and it appears likely that an average yield of around 50 per cent will be achieved eventually. One way to cut down on the amount of metal in risers is to make them much lower and increase the cross sectional area. This gives a good hot well of metal to feed the casting as it solidifies, and at the same time not so much metal is needed to form the high riser usually employed.

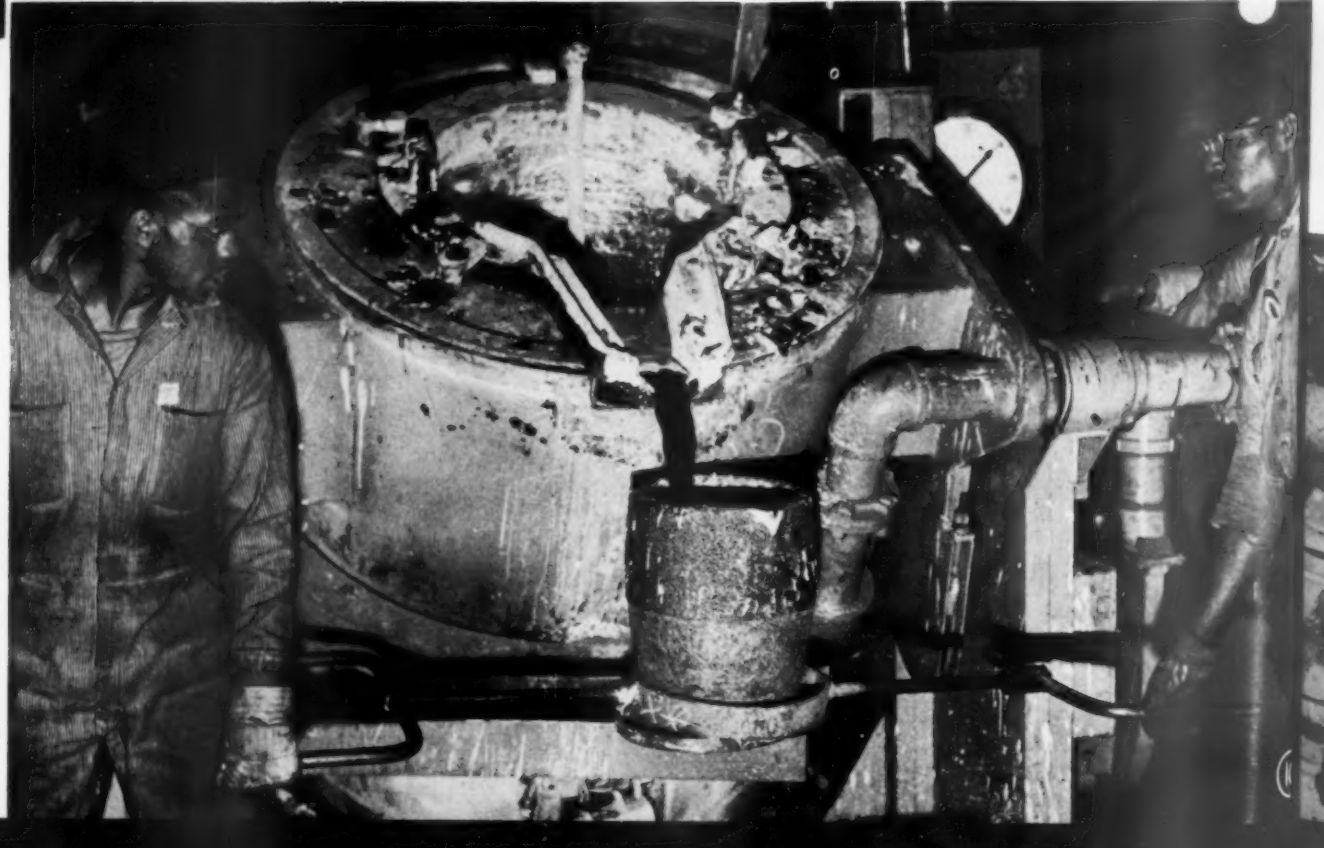
Packard's four cupolas are now gathering cobwebs but nearly every other square foot of floor space in the plant has been made use of in the conversion to aluminum production. In the heyday of automobile manufacture, this foundry had no trouble in turning out 250 tons of finished





gray iron castings a day, mostly motor parts such as heads, blocks, flywheels, etc. Now the same space is geared to turn out 30,000 pounds of finished aluminum castings per day, which gives an interesting comparison of the output per square foot of floor space, gray iron versus aluminum, the advantage being better than 17 to 1 in favor of iron.

Virtually all of the former core room was adaptable to the aluminum work, although many of the cores required are considerably larger than anything required for automobiles. Core-blowing has been applied in many cases to cores which in other aluminum shops require hours of bench work to complete and which can be blown automatically in only a fraction of the time. A number of women employes have been hired to work in the core room, marking a distinct departure in employment practice, but one which so far has been entirely (*Please turn to page* 224)



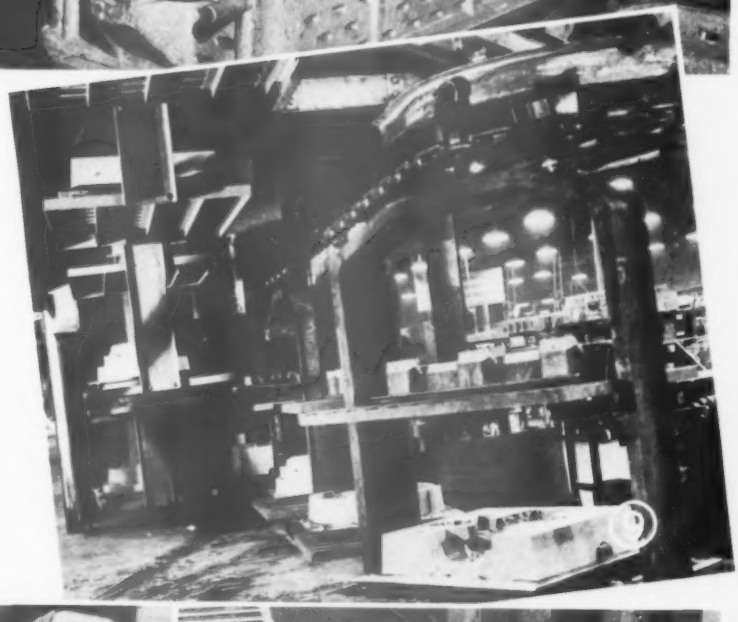


Fig. 5—Finished casting clamped in fixture for pressure test. Fig. 6—Accuracy and precision are required in aircraft engine castings. Fig. 7—Pouring large aluminum casting. Fig. 8—Target gage before mounting casting in place for checking. Fig. 9—Core conveyor as it enters oven. Fig. 10—Pouring ladle receiving metal from 1000-pound tilting furnace. Fig. 11—Close-up of automatic pouring lip. Rotating head has four slots through which metal flows into molds. Speed of rotation geared to mold speed so that spilling does not occur. Fig. 12—Molten aluminum is tapped from side of remelt furnace

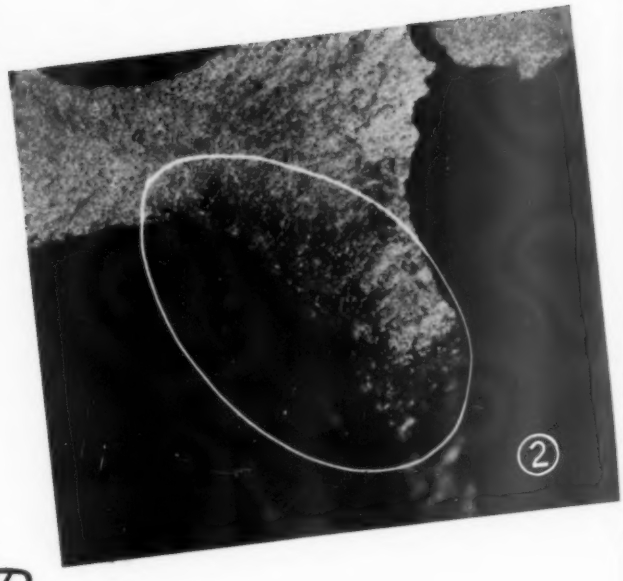


Fig. 1—Cracked casting due to core with excessive dry strength. Fig. 2—Sand attack in magnesium casting, against core face as indicated by white circle. Enlarged 3X. Fig. 3—Inspecting a magnesium casting. OWI Photo by Palmer

CORES FOR Magnesium Castings

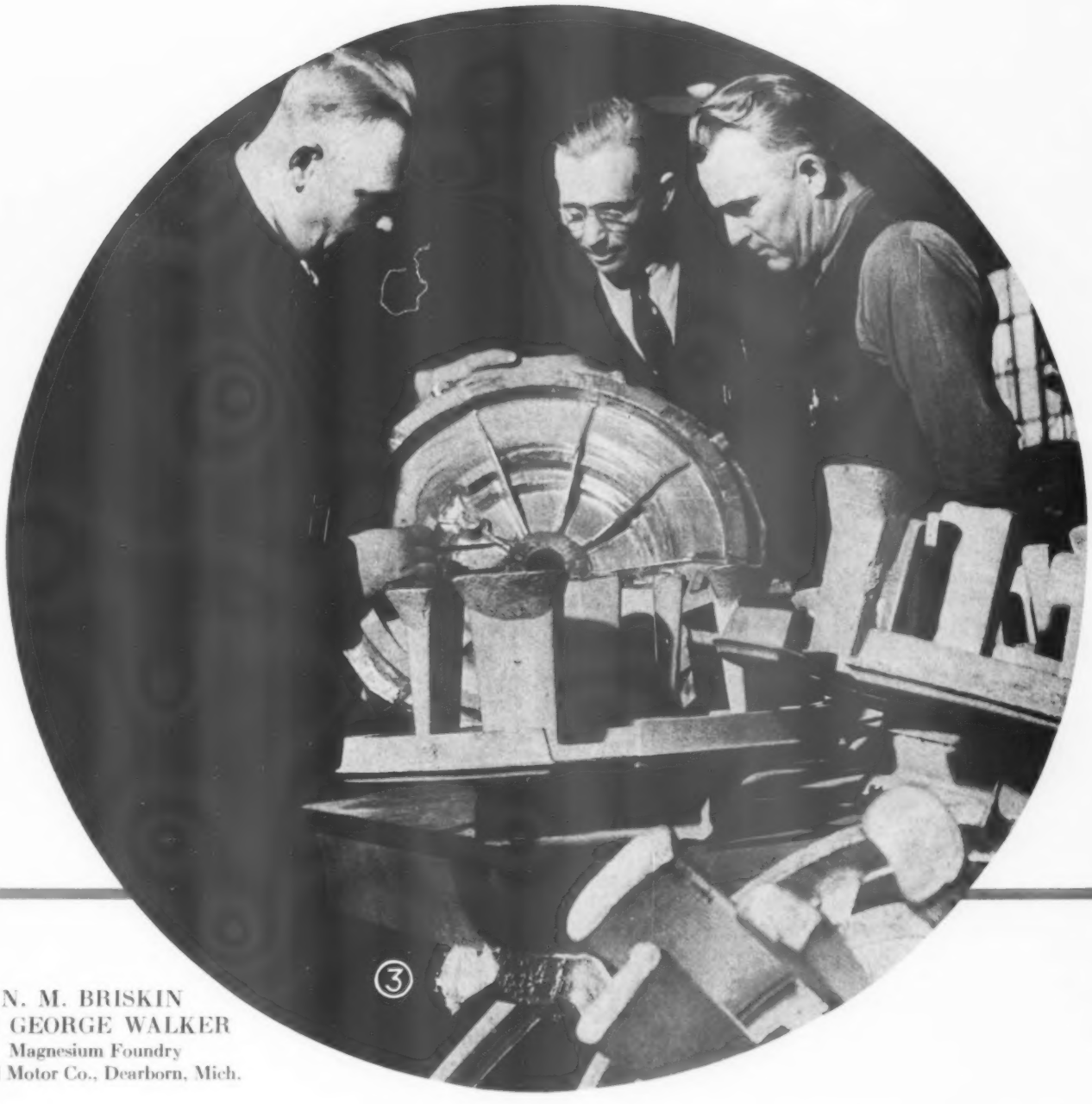
THIS discussion is an attempt to review and to shed light on basic principles in the making of cores for use in pouring magnesium castings, and to show how some of these principles have been applied at the Ford magnesium foundry. Methods set forth combine some of the good points gathered from various sources. Magnesium foundries already in production were good enough to extend their help when the Ford organization began making magnesium castings for the Pratt-Whitney engine. Some of the ideas have been contributed by the men in the Ford shops, several of whom have spent 30 years or more in the foundry industry. After many thorough tests in the metallurgical laboratories and in the shop, the best points of each idea were taken and combined with new developments for use in production. Much of the experience in the application of time and labor-saving equipment, long used in the Ford gray iron and steel production foundry, has been applied.

Many other types of sands, core-binders and baking methods may prove equally satisfactory to those discussed. The following facts are presented only to show what the Ford company has found most suitable for the purposes thus far, and to compare them with other methods in current use today.

In many respects sand cores for magnesium foundry work are quite similar to cores used for other metals. However, the differences in properties between magnesium and other metals, namely: lightness, high shrinkage, low thermal capacity, and chemical reactivity, must be taken into consideration in making cores and designing core sand mixtures with definite sets of properties for use in making magnesium castings. The effect of each of these properties on the type of cores necessary will be considered in detail later.

Let us first review briefly some of the basic properties which the ideal sand core must have for use with any metal. The sand mixture to be used in making the core must permit ramming into the core box and easy removal without excessive sticking to the surface of the box. Sand must not dry out during delivery to the core bench or during storage on the bench before it is used. The rammed core should bake evenly and thoroughly, as rapidly as possible, without warp or sag, and should maintain the desired dimensions after baking. The baked core should be capable of being stored until used without loss of strength or absorption of moisture.

The finished core should have a surface which will withstand the necessary handling before the core is placed in the mold, and should be able to impart a smooth surface to the casting. It must withstand the erosive or cutting action of the molten metal which is being cast. It must not generate an excessive amount of gas when it comes in contact with molten metal and



By N. M. BRISKIN
and GEORGE WALKER
Magnesium Foundry
Ford Motor Co., Dearborn, Mich.

must permit free escape of any gases which may be generated. It must hold together during the casting operation for a sufficient length of time for the metal to acquire a set. On the other hand, an ideal core should not be so strong as to prevent free shrinkage of the casting and should disintegrate sufficiently soon after pouring to permit easy core removal after the casting has solidified.

Now, consider the ways in which magnesium differs from other metals, so that we may understand the special properties which cores for magnesium foundry work must have. Contraction which takes place in a magnesium casting varies from ⅛-inch per foot for large castings to 11/64-inch per foot for small castings according to *Dowmetal Data Book*, Dow Chemical Co., 1941. This property of high shrinkage coupled with that of hot-shortness, makes it necessary for magnesium cores to have low strength at higher temperatures in order not to crack the castings. This is especially important in jacket core or sumps where the core is almost completely surrounded by metal, as shown in Fig. 1. (*Please turn to page* 227)

Table I

Thermal Capacity of Various Metals

Metal	Mean Specific Heat, On Weight Basis, Cal/grm/°C, Solid	Mean Specific Heat, On Weight Basis, Cal/grm/°C, Liquid	Latent Heat of Fusion, On Weight Basis, Cal/grm/°C	Mean Specific Heat, On Volume Basis, Cal/ccm./°C, Solid	Mean Specific Heat, On Volume Basis, Cal/ccm./°C, Liquid	Latent Heat of Fusion, On Volume Basis, Cal/ccm./°C	Specific Gravity
Lead	0.03	...	6	0.34	...	68	11.3
Magnesium	0.28	0.30	50	0.50	0.54	90	1.8
Aluminum	0.25	0.26	92	0.68	0.70	250	2.7
Copper	0.10	0.12	50	0.89	1.06	440	8.9
Iron	0.16	0.17	64	1.25	1.34	500	7.8

Table II

Properties of Two Core Sands

	Round-grain Silica	Sharp Sand
Base Permeability	300 to 400	275 to 375
A. F. A. Grain Fineness	38 to 45	40 to 50
Per Cent Retained on Three Adjacent Screens	85 to 95	80 to 95
Per Cent Fines	0.0	0.0

Reducing Diameter of Cupola Lining Decreases Capacity

Our cupola lined to 42 inches diameter melts from 6 to 7 tons per hour. Is it practical to place a 5-inch lining on the inside to reduce the melting speed to between 4 and 5 tons per hour?

Changing the inside diameter of a coupola to increase or decrease the melting speed is fairly common practice in the gray iron foundry. In this instance the new lining, ordinary fire bricks set on end and with one narrow face exposed, is built inside the existing lining. It is not necessary to carry the new lining from the bottom to the top of the cupola. The reduced area need extend only from the tuyeres to a point approximately 4 feet above, that is in the area where the melting takes place. Several alternative methods are available for supporting the new lining. The method selected will depend to some extent on the style of the tuyeres. Individual tuyeres may be extended to support the new wall. A cast iron ring inserted above the tuyeres and extending the necessary distance will support the bricks.

Under certain conditions the foundryman may prefer to build the new lining all the way from the bottom. In that case also a retaining ring is needed to support the bricks. At a point about 4 feet above the tuyeres the top ends of the bricks may be chamfered to merge with the old straight wall. However, this is optional, since the descending charges soon will wear the ends off the bricks. We assume that you are adjusting your blower to meet the new melting requirement, that is to deliver approximately 1800 cubic feet of air per minute instead of the present 2800 cubic feet.

To Make Statuary Castings in Permanent Metal Molds

When aluminum and other alloys again become available we are contemplating the manufacture of small statuary and ornamental castings in permanent molds and will appreciate information on any book or books covering metals and mold materials, how to make the molds, etc.

So far as we know there is no book devoted exclusively to the subject of permanent molds for small line statuary. Die casting—which of course is a more elaborate process than you contemplate—is covered fully in *Die Casting Practice*, by Marc Stern. A chapter in *Gates and Risers for Castings*, by Pat Dwyer is devoted to the subject of permanent molds for aluminum. A study of either of these sources of information would provide you with a general foundation on which to proceed. Castings are made in permanent molds under several methods, but the castings you have in mind nearly all are made according to a method known as slush casting.

The mold is filled with molten metal and allowed to stand for a definite number of seconds until a solid shell has developed next to the mold surface. The remainder of the metal then is spilled back into the pot, leaving a thin casting, hollow on the inside, and conforming to the desired shape on the outside. The molds are bronze, made in two or more parts, hinged together, or assembled in other suitable manner for removal of the casting. Obviously, the production of the mold can be entrusted only to a person of considerable skill and experience. Commercial castings made in this type of mold either are zinc or antimonial lead in which the antimony content varies from 14 to 18 per cent. To attain accuracy, finish and sharpness of detail, the parts of the bronze permanent mold usually are cast in plaster of paris molds.

Mixing Ladle on Small Cupola Needed for Desulphurizing

At present we are melting about 2 tons per hour in a cupola lined to 24 inches, equipped with 5 tuyeres 28 inches from the bottom and a slag hole 24 inches above the bottom. We are considering the advisability of desulphurizing the metal and will appreciate your opinion on the following items: 1—Is there any particular advantage in using a U-shaped ladle for desulphurizing with soda ash? 2—What capacity ladle would serve most satisfactorily in front of a 24-inch cupola? 3—At what temperature should the iron be tapped from the cupola? 4—What is considered the best method for preheating the mixer ladle? To what temperature is the lining raised? How long can the iron be held in the mixer ladle? 5—Is an 8-inch lining thick enough for the ladle? 6—Should the iron flow continuously from the cupola or can we tap it intermittently as at present?

Your tuyeres and slag hole are about 10 inches higher, therefore your coke bed is correspondingly higher than in ordinary American practice. If necessary you can collect over 1000 pounds in the well of the cupola between taps. This is approximately the amount of two charges of 400 or 500 pounds each. Taking your questions in the order of presentation in your inquiry the following comment is offered: 1—The U-shaped ladle is favored because the metal from the cupola spout enters near one end and flows out through a spout on the opposite side near the other end. With this arrangement the soda ash has a better chance to function. 2—If the iron can be distributed rapidly a 1000-pound mixer ladle probably would serve most satisfactorily. 3—Iron should be tapped from the cupola at a temperature between

2700 and 2800 degrees Fahr. (1482 and 1540 degrees Cent). 4—Ladles are preheated with a gas or oil torch. The lining is raised to a bright red heat. The desulphurizing action takes 5 to 6 minutes. The metal then can be held in the ladle for an additional 10 minutes without appreciable loss in temperature. For further detail on this and many other interesting items of the desulphurizing process, we suggest that you get in touch with firms producing desulphurizing agents. 5—A lining 8 inches thick in the mixer will serve. 6—If you are pouring heavy section castings where loss of temperature is not of great importance the iron may be desulphurized in lip ladles, and the slag removed when the reaction ceases. However, for light section castings and production work desulphurization should be carried on continuously in the mixing ladle at the spout; additions of soda ash being made from time to time according to the melting rate.

Many Methods To Prevent Sand From Sticking to Patterns

What is considered the best wash or pattern dressing for cast iron patterns to prevent sand from sticking?

Obviously many materials of an excellent character are employed as pattern coatings, and each has its advocates. Also may we point out that coating materials are divided into two general classes. One is brushed or sprayed over the pattern each time it is used. The other is applied as a semipermanent coating serviceable over a comparatively long period. The first class includes kerosene or gasoline, either in the natural state, or containing approximately 10 per cent tallow in solution. The second class includes beeswax, bayberry wax and shellac or lacquer. The waxes are melted to a thin liquid and applied with a brush to the slightly warmed pattern. Extra smoothness is imparted by rubbing the surface with a brush. The shellac and lacquer are applied as in ordinary wood pattern practice. In addition several proprietary materials are available from foundry supply houses.

Trouble With Cores Is Due to High Collapsibility Rate

We have a problem of metal burning in on cores in thick wall bushings. The interior of the bushings show sharp crisscrossing fins which get larger as the thickness of the wall increases. We have seen a reference to the effect that addition of clay will help, and we would like to know the kind of clay and amount to add. We are using a local bank sand and a proprietary core oil which gives excellent results with thin wall bushings.

Your trouble is not what usually is termed burning-in whereby the metal penetrates into the sand and sometimes fuses to it to give an extremely rough surface, but rather is what is called finning or fissuring. Consensus seems to be that such defects result from high rate of collapsibility of the core due to the generation of a large amount of heat. That also is borne out by your remarks that the core mixture you are using is satisfactory for thinner wall bushings.

As you mention, addition of clay substance is one of the means to decrease the rate of collapsibility of the core. Others include use of more core oil to give a stronger core, use of finer sand, and addition of around 2 per cent iron oxide. The clay may be a good grade of refractory fireclay or bentonite, but the amount to be added will have to be determined experimentally by a gradual increase.

The Casting Industry Advances

TECHNICAL progress stimulated by war demands has resulted in a great advance in foundry methods. Not only are better castings being made than ever before, but also, foundrymen throughout the country have learned to maintain quality in the face of restrictions on critical materials and shortages of skilled workmen.

The American Foundrymen's Association will hold its Second War Production Congress in St. Louis on April 28, 29 and 30. The program is especially directed to the solution of problems connected with the war. The technical sessions will cover a wide variety of subjects and speakers of national prominence will address the general meetings.

This annual meeting has been condensed into three busy days and the schedule has been arranged to eliminate as much conflict as possible between sessions of interest to each branch of the industry.

Operating and technical men who attend the congress will have an opportunity to keep themselves up-to-date in the rapid strides taken by the industry. Never before in the history of our industry has a meeting of this kind been so important.

Castings are helping win the war; better castings will help win it sooner.

D. P. Forbes

President

American Foundrymen's Association

Copper Casting Not Easy to Make

We will appreciate all the information you can give us pertaining to the production of pure copper castings.

Production of pure copper castings requires considerable skill if that is actually what is meant since many of the commercial "pure" copper castings really contain a small amount of zinc. When zinc is used the amount ranges from 1 to 2 per cent, but even that small quantity reduces the electrical conductivity considerably. However, the usual cross section of the castings is sufficiently large to compensate for the reduction.

Molten copper has a great avidity for oxygen and other gases so that it must be melted carefully, and then degasified to insure sound castings. At the present time there are a number of degasifying agents which are claimed to produce sound copper castings with relatively high conductivity. These include magnesium, calcium boride, boron suboxide, and silicon or beryllium with chromium. With the first three only enough of the agent is added to perform the degasifying function without leaving anything but a trace of the substance in the copper. The remaining two have a definite alloying action.

Magnesium to be effective must be plunged beneath the surface of the copper through use of a phosphorizer, and you will have to experiment to determine the proper amount to meet the conditions previously mentioned. Information on the use of boron suboxide and calcium boride should be secured from the producers, and the directions followed closely to attain the desired results. The same applies to the use of silicon or beryllium and chromium.

Sand molds for copper castings should be worked as dry as possible with preferably not over 6½ per cent moisture. The molds should be vented well, and since copper when properly degasified, shrinks considerably, adequate risers must be provided.

Determine Costs on Own Foundry Data

We wonder if you have in your files any data giving the proper percentages of overhead expense, labor, metal costs, etc. for a gray iron foundry. We have various publications showing different forms of uniform accounting, but we have no method of interpreting that percentage.

Proper percentages of overhead, expense, labor, metal costs, etc., for a gray iron foundry are not available. If it were possible to establish a general set of figures of that nature, they would be of no use to any foundryman because a foundry does not operate all of its basic departments in conformity with the average of the industry.

To clarify that statement let us briefly set forth some of the reason why a general figure would not be useful to any foundryman. The usual jobbing gray iron foundry consists of four basic operations namely, melting, coremaking, molding and cleaning. The natures of those operations are quite different, and therefore, a general overhead distribution used in calculating costs of individual jobs does not give accurate results.

The function of the melting operation or department is to prepare molten iron for pouring into molds. Therefore, the pounds of iron melted is the proper and accurate basis on which to calculate the cost of melting. Calculating the cost of melting on the basis of good castings produced, is bad practice in foundries where there is a marked difference in the percentages of good castings obtained to the total iron melted for individual jobs. That factor alone prohibits intelligent establishment of general industry percentages as there is a wide difference in types of castings produced by different foundries. It does not seem sensible to disregard the varying costs of pig, scrap, etc. and the varying percentages of elements entering into many different mixtures used in producing melted iron. Those variances occur in the industry as a whole and often in the individual foundry.

The function of the coremaking department is to produce cores where needed to set in the mold in such position that the contour of the molded casting may be secured. Intelligent analysis of that operation shows that: (a) Not all castings produced contain cores. (b) The cost of core material in some cores is greater than the cost of labor to produce. (c) The cost of labor to produce some cores is greater than the cost of the materials used. (d) Some cores are more intricate, and require more or expensive labor than simple cores. With those existing conditions both in the industry and the individual foundry, a useful percentage of blanket nature seems out of the question.

Function of the molding department is to make molds for shaping the casting. Any cost incident thereto must be predicated on the time required. Therefore, it seems senseless even to consider the use of general percentages on any basis of distribution. There are so many shapes and sizes of castings cleaned in the jobbing foundry, and so many methods used in the industry that it is impossible to set up or determine a general percentage to be used in calculating the cost of an individual casting. Cleaning costs should be determined by measuring the time required to clean each casting. In doing that care should be used not to spend more effort than is practical for each case.

There are so many variations in the way the different firms in the industry administer business, supervision, selling, accounting, shipping, etc. that a general percentage for applying those expenses to cost of casting cannot be obtained

(*Concluded on page* 146)

GANGWAY!

By Pvt. J. A. Patterson

"What did I tell you about keeping those windows shut with that airplane factory next door. Now look what you've done."

ON THE MARCH
to aid Foundrymen...

NICKEL FIELD REPRESENTATIVES

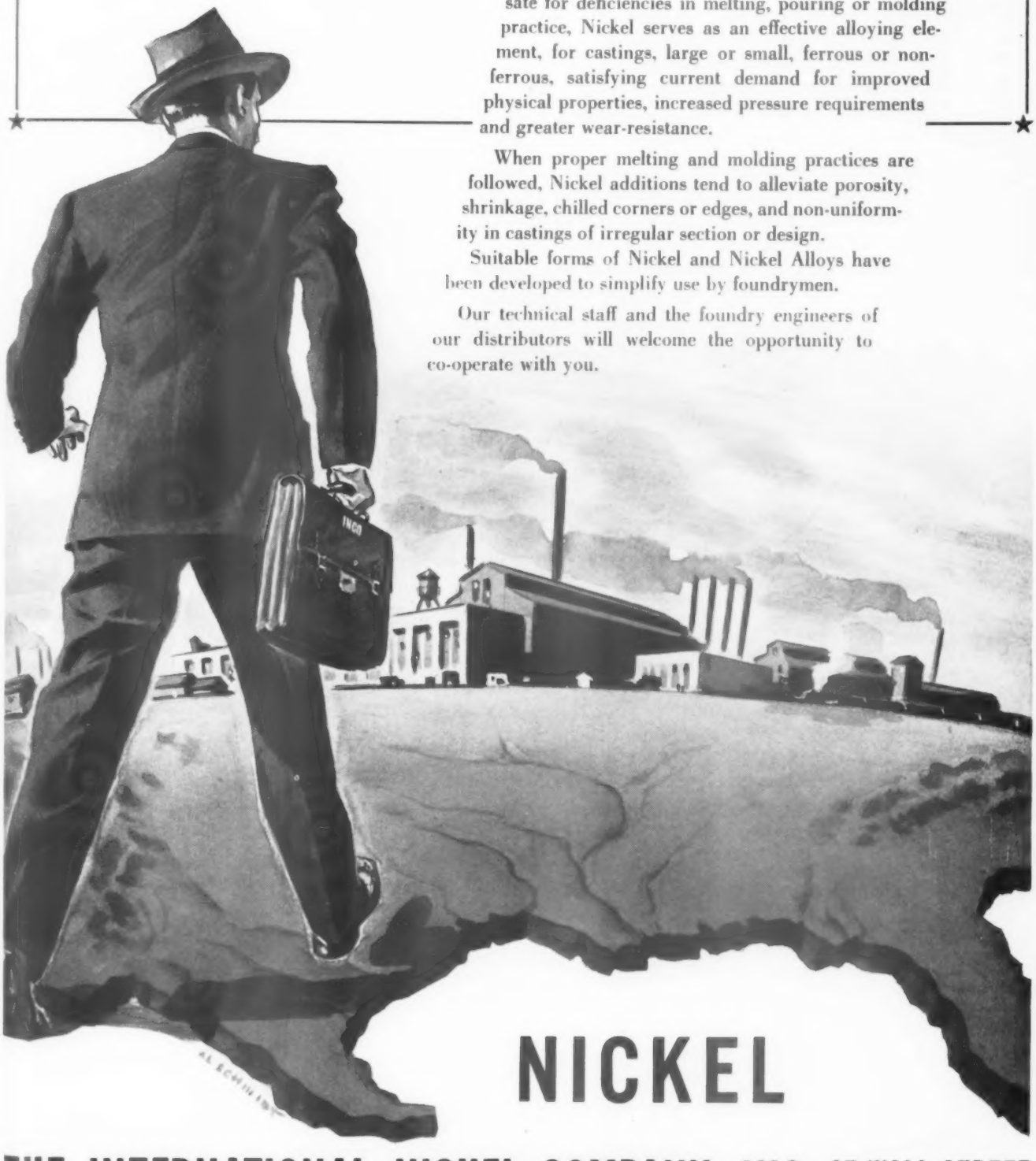
are always "on the go." By reason of training and experience they are equipped to offer timely assistance on foundry problems.

While not a "cure-all" in that it will not compensate for deficiencies in melting, pouring or molding practice, Nickel serves as an effective alloying element, for castings, large or small, ferrous or non-ferrous, satisfying current demand for improved physical properties, increased pressure requirements and greater wear-resistance.

When proper melting and molding practices are followed, Nickel additions tend to alleviate porosity, shrinkage, chilled corners or edges, and non-uniformity in castings of irregular section or design.

Suitable forms of Nickel and Nickel Alloys have been developed to simplify use by foundrymen.

Our technical staff and the foundry engineers of our distributors will welcome the opportunity to co-operate with you.



NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

(*Concluded from page* 144)
intelligently, and if obtained would be useless to the individual producer.

The only way to secure an answer to that question is to analyze the particular operations. Comparison of the particular operations with others in the industry must be broken down in such a manner that the operations being studied are uniform with those with which they are comparing. Otherwise comparisons are extremely misleading.

Estimate Weight of Brass Sleeves

Can you suggest a book containing charts showing the weight of metal in various sizes of cylindrical nonferrous castings including liners, sleeves, rings and bushings.

The Foundryman's Handbook, published by the Penton Publishing Co., Cleveland, among many other features shows the weight of rods or cylinders per running inch in diameters ranging from ⅜-inch to 107 inches in cast iron, steel, aluminum, copper, zinc, gun metal and yellow brass. To find the weight of a hollow cylinder it is only necessary to subtract the weight per running inch corresponding to the inside diameter, from the weight corresponding to the outside diameter and then multiply the result by the length of the casting in inches. The product is the weight required. This section of the book also has tables of weights for many other types of castings and in addition has formulas for computing the weight of all plain and irregular shaped sections.

Recently, a well known manufacturer of foundry equipment has developed a handy slide rule for determining weights of castings by dividing them into various geometrical forms, and it is suggested that you consult the advertising pages of THE FOUNDRY for information on it.

Casts Brass Wings On Steel Shaft

We operate a small brass foundry in connection with our gray iron foundry for production of parts for a semi-rotary pump. In the brass foundry we are having trouble in making a satisfactory oscillator comprised of a steel shaft 1-inch in diameter on which brass wings or vanes are cast on. Numerous holes appear in the brass vanes adjacent to the shaft, and we would like to know how they can be eliminated. We heat the shafts considerably before placing in the mold.

When molten metal comes in contact with solid metal, trouble always will result unless the latter is perfectly free from moisture, rust, grease, scale, etc. You mention that you heat the shafts around which the brass is cast which should eliminate moisture, provided the molten brass is poured shortly after the mold is closed. However, scale or other dirt on the shaft still can cause blows and other agitation when the molten metal strikes it. Therefore, the shaft first should be cleaned by abrasive blasting or other means to insure a clean surface, and then maintained in that state.

Heating or warming the shaft should be accomplished in a core or similar oven, and not in a direct fire such as a forge fire since the latter may result in scale formation. Such heating need not be so high since its function is to prevent precipitation of moisture on the shaft from the damp, warm sand. The warmed shaft should not be placed in the mold until just before pouring. In other words put the shaft in the mold, close, and pour.

With a shaft that is clean; warmed before placing in the mold, and the metal poured shortly thereafter, you should have no trouble in obtaining sound castings. However, if the difficulty still persists, the only other suggestion is to arrange the mold with a run-off or flow-off gate which will permit the first metal poured into the mold to flow out. After sufficient molten metal has passed through to heat the shaft to the desired point, the flow is stopped off, and the mold filled. Location of the flow-off will depend on how the mold is made.

Hard Cores Crack And Cause Fins

We are having trouble in making bushings for the sawmill trade. The cores crack longitudinally making fins in the bore that are hard to get out. The condition gets worse progressively as the thickness of the wall increases. We employ a molding sand, used by a local iron foundry, bonded with linseed oil, and we bake in an outdoor, home-made oven for 3 hours or less, using wood fuel. Coating the cores does not seem to help. We are using a tin-bronze. Metal temperature is around 2000 degrees and we pour at about 1800 degrees Fahr. for the heavy sections.

Cracking of your cores probably is due more to the condition during drying than anything else, although there are other factors which may cause similar problems. Chances are that the cores are rammed too tightly. They should be rammed loosely in the center, or that part formed with much coarser sand. Use only a layer of fine sand on the outside to give a smooth surface. For fairly good sized cores it frequently is advisable to use gravel or pieces of coke in the interior to give good venting qualities both in drying and in the mold. Examine the cores when taken from the oven and you undoubtedly will find hair cracks on the surface. Those open up when subjected to pressure of the metal and the metal runs in. Where heavy metal sections surround the core, the cores are subjected to high temperature for an extended period which increases cracking and allows greater metal penetration.

For that reason it is advisable to coat the cores with some refractory material such as a mixture of graphite, clay and water, which is rubbed onto the dry core by hand. After that the cores are dried again. Other types of refractories such as zirconium flour, are available for coating cores. Sometimes tin-bronze containing phosphorus will cause considerable trouble with penetration since it appears more fluid and will find the tiniest crack. The temperature at which you pour your metal is not far from standard practice although 1800 degrees Fahr. seems a little low unless the walls are quite heavy. We believe that 1900 degrees is a more average temperature. Do not go to 2100 degrees as the metal will burn into the core.

Dirt and Gas Holes Found in Hub

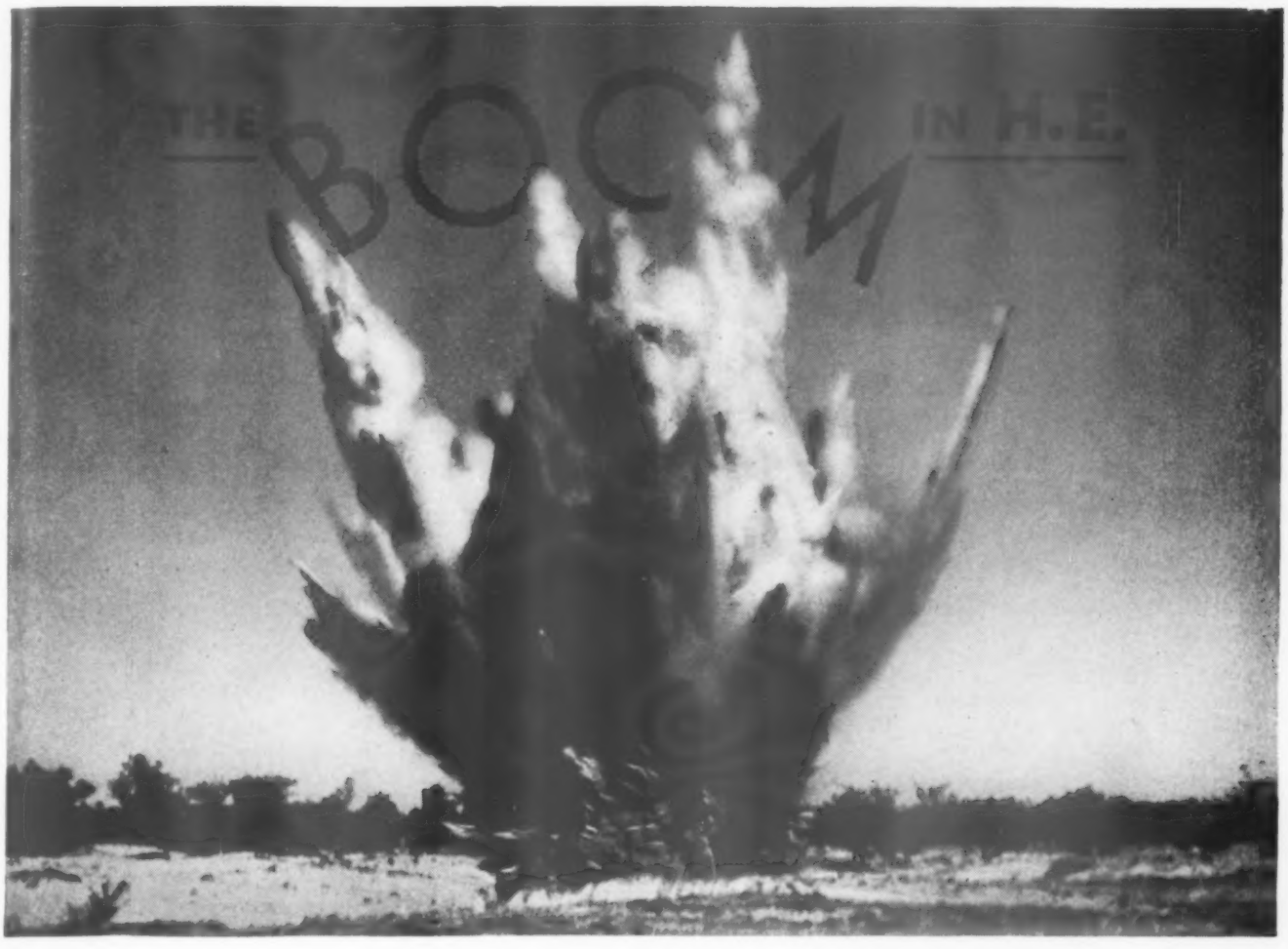
We are casting winches that weigh about 90 pounds and find the dirt and small gas holes are collecting in the lower hub of the casting. The trouble is found after taking off a small cut.

It is difficult to theorize on where the dirt in your winch castings comes from. The blowholes obviously are entrapped bubbles either from gases arising from the mold, blowing cores, or possibly dissolved gases in the metal. The dirt may come from sand eroded by the onrush of molten metal as it passes down the sprue or gates into the casting or from washing off sharp edges of the mold. Elimination of the bubbles or holes may be accomplished by planning the gates and risers so that the gas bubbles may pass freely into the risers.

Similarly in the case of the dirt, the gates should be located so that the erosive action of the metal stream is reduced to a minimum. The large end of the horn should be attached to the casting instead of to the sprue, or a choke inserted at the juncture of the sprue and horn gate to make the opening somewhat smaller than that into the casting. One satisfactory way of studying gating where scum or erosion exists is to make an opening through the cope which will permit observation of the flow of metal into the mold.

By watching the flow you can determine whether the metal stream is dragging in particles of sand or whether it is wiping off sharp corners of the mold, and also you can see how the metal spreads over the surface of the mold cavity. You may find that you do not have enough gates or that the metal squirts into the mold with sufficient force to damage it. Again you may find that the sprue is too large and permits the stream of metal to rush down in such a way as to carry air with it.

It may be advisable to locate a riser on your casting so that an additional amount of metal may be flowed through the mold, over and above that required to fill it. That flow will tend to wash the gas bubbles out and also provide cleaner metal which will insure greater soundness. While some foundrymen believe that red bronze or brass does not require a riser for feeding purposes, you will find that if maximum soundness is desired in the casting, a suitable riser is essential.



Buell Dust Recovery Systems help put it there

High Explosives are "booming" these days. America's arsenals are turning out astronomical quantities of bombs, shells and torpedoes...every one with a deadlier-than-ever "boom" for our enemies.

Sulphuric acid is important in the manufacture of explosives, but absolute purity of the acid is essential. Buell Dust Recovery Systems are used in conjunction with the contact method of making sulphuric acid because their high efficiency in removing contaminating flue dust from the sulphur dioxide gas assures purity in the finished product.

This is just one of many ways in which versatile Buell Dust Recovery Systems are helping industry achieve its war production goals by preventing contamination and salvaging critical materials for re-use. The van Tongeren "shave-off"—an ingenious design feature found only in Buell cyclones—insures exceptionally high collection efficiency, low operating cost and long life. Buell cyclones have no moving parts and require little or no maintenance or attention.

Buell Dust Recovery Systems easily handle high temperature gases, and can be installed for any desired capacity from 300 c.f.m. up.

Factual 28-page book. Write for Bulletin F-43.

Memo to
FOUNDRIES
Buell Dust Recovery Systems are widely used in connection with
SHAKE-OUTS
CRACK-OFFS
TUMBLING BARRELS
GRINDING AND BLAST FINISHING OPERATIONS
to reduce hazardous dust nuisances and to reclaim valuable material for re-use.

buell
DUST RECOVERY SYSTEMS

BUELL ENGINEERING COMPANY, INC.
14 Cedar Street, New York
Sales Representatives in Principal Cities

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

MEN ...of Industry

WILLIAM G. REICHERT has resigned as chief foundry metallurgist, American Brake Shoe & Foundry Co., to organize the W. G. Reichert Engineering Co., 1060 Broad Street, Newark, N. J., specializing in mechanization, appraisal and improvement of foundry operations. Other services include aiding management in the manufacture of centrifugal castings and the conversion of steel, gray iron and nonferrous foundries for present and postwar needs. Mr. Reichert previously has served in various foundry capacities as manager, metallurgical engineer, chemist and metallurgist.

♦ ♦ ♦

Stanley Norrick has been appointed general foundry engineer, Perfect Circle Co., New Castle, Ind. Mr. Norrick, has been plant manager since 1926. **Richard H. Bancroft,** formerly assistant plant manager, has been appointed manager. Mr. Bancroft was first employed at the New Castle plant as research metallurgist in 1931 and has served as assistant plant manager for the past 2 years.

♦ ♦ ♦

Bruce L. Simpson has been made president, National Engineering Co., Chicago, succeeding his father, **Herbert S. Simpson,** who becomes chairman of the board. The new president is a young man, conversant with the details and policies of the business of the company which has been engaged in manufacture of sand mixers, sand handling and mold conveying equipment for 30 years. He graduated from Northwestern University and later received his degree of law at Northwestern Law School in Chicago. Mr. Simpson previously was vice president of that organization, and has devoted his efforts mainly to production problems of the company.

♦ ♦ ♦

Lt. Col. John Slezak, since last December, deputy chief, Chicago Ordnance District, has been promoted to the rank of colonel.

♦ ♦ ♦

S. B. Taylor, works manager, Reliance Electric & Engineering Co., Cleveland, since 1931, has been elected manufacturing vice president of the company.

♦ ♦ ♦

Harold J. Walsch recently has been elected president and general manager of the Lectromelt Steel Casting Co., and the Barberton Foundry Co., Barberton, O.

♦ ♦ ♦

Oscar E. Kiessling, Washington, recently was elected secretary, Machinery and Allied Products Institute, succeeding **George Terborgh** who has been made research director.

♦ ♦ ♦

John M. Davies has been named director of physical research, B. F. Goodrich Co., Akron, O. Mr. Davies has been with the research division of the Goodrich company since 1926.

♦ ♦ ♦

Mary M. Donovan, former graduate assistant at the University of Pittsburgh, has been appointed to the technical staff of Battelle Memorial Institute, Columbus, O. Miss Donovan is a graduate of Carnegie Institute of Technology from which school she was graduated with a bachelor of science degree in chemistry, and from the University of Pittsburgh with a master of science degree. At Battelle, Miss Donovan will be engaged in research on the electron microscope and its utilization.

♦ ♦ ♦

Lincoln R. Melville, former personnel director, Buffalo Pipe & Foundry Corp., Buffalo, is to graduate soon as an ensign from the midshipmen school at Columbia University.

♦ ♦ ♦

William J. Priestly, formerly chief, Alloy Steel Branch, Steel Division, WPB, Washington, has resigned to return to his post as vice president in charge of research and development, Electro Metallurgical Co., New York.

♦ ♦ ♦

Andrew F. Furlani, recently plant superintendent, has been elected vice president in charge of operations of Hartford Electric Steel Corp., Hartford, Conn., and Roxbury Steel Casting Co., Roxbury, Mass.

♦ ♦ ♦

Franklin Farrel Jr., was elected chairman of the board of the finance committee, Farrel-Birmingham Co., Ansonia, Conn. at the annual meeting of the company held on Feb. 18. Other officers elected include: Vice Presidents, **A. G. Kessler, Carl Hitchcock, Austin Kuhns,** and **R. A. North;** Treasurer, F.

(Continued on page 150)

Bruce L. Simpson

W. G. Reichert

Stanley Norrick

R. H. Bancroft

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

(*Continued from page* 148)

M. Drew Jr.; Secretary, **George C. Bryant;** Assistant Secretary,**W. B. Marvin.** Directors of the company elected at the meeting are: **Franklin Farrel Jr., F. H. Banbury, Charles F. Bliss, Alton Austin Cheney, Julius G. Day, F. M. Drew, Jr., Franklin Farrel 3rd, R. A. North, Austin Kuhns, W. A. Gordon, Edward H. Green, Carl Hitchcock, Franklin R. Hoadley, A. G. Kessler, W. B. Marvin, George C. Bryant, Emil Berges.**

♦ ♦ ♦

Douglas C. Williams, formerly connected with the research laboratories, American Steel Foundries, East Chicago, Ind., has been appointed to the fellowship at Cornell University, Ithaca, N. Y., maintained by the American Foundrymen's Association for the study of the properties of foundry sands. Graduated from Beloit College in 1930, Mr. Williams was associated as a chemist and engineer with such companies as the J. R. Short Milling Co., Chicago; E. I. du Pont de Nemours Co., Wilmington, Del.; Delco-Frigidaire Division, General Motors Corp., Chicago, and various public utility companies prior to joining American Steel Foundries. His work with that company was identified with study of steel foundry sands. At Cornell he will conduct work on the effect of elevated temperatures on the physical properties of steel foundry sands under the direction of Prof. J. R. Moynihan, head, Department of Engineering Materials, Sibley School of Mechanical Engineering. Dr. H. Ries, Ithaca, N. Y., A.F.A. sand research committee, will act as advisor.

♦ ♦ ♦

Horace A. Deane, formerly assistant works manager, Brake Shoe & Castings Division, American Brake Shoe & Foundry Co., New York, has been appointed works manager of the division succeeding **W. Scott Fraula** who has been serving both as works manager of the Brake Shoe Division and operating assistant to the president of the American Brake Shoe & Foundry Co. since August, 1942, and now will devote his entire time to the latter position. As operating assistant to the president, he will be available to the company's eight operating divisions.

Mr. Fraula started with the Brake Shoe & Castings Division in 1921 as an apprentice and worked at several plants of the company, including Mahwah, N. J., Portsmouth, Va., and Pittsburgh. By 1924 he was general foreman, and in 1929 he was appointed assistant superintendent of the plant at Mahwah. Two years later he became assistant general superintendent of all plants of that division. Mr. Fraula was appointed work manager of the Brake Shoe & Casting Division in July, 1938, and was appointed operating assistant to the president of the parent company in August 1942. In addition to his other duties Mr. Fraula heads the company's medical department.

Mr. Deane joined the Brake Shoe company in August, 1939 as assistant manager of the Brake Shoe & Castings Division.

Joins The Foundry Staff

William G. Gude, for the past 16 years associated in an editorial capacity with various publications of Penton Publishing Co., has joined the staff of THE FOUNDRY in Cleveland as associate editor. A graduate of Purdue University, he joined the company in 1926 and was made resident editor at Pittsburgh in 1928. From 1932 to 1938 he was Chicago editor, serving for a time as secretary of the Chicago chapter of the American Foundrymen's Association. Following a year as eastern editor in New York, he was recently associated with *Daily Metal Trade* and *Steel* in the Cleveland office.

♦ ♦ ♦

R. G. McElwee, Vanadium Corp. of America, Detroit, has been appointed general chairman of the Cupola Research committee of the American Foundrymen's Association, succeeding Don J. Reese, International Nickel Co., who has resigned. Both Mr. McElwee and Mr. Reese are associated with WPB at Washington. Mr. McElwee also is chairman of the Committee on Ferrous Metals and Alloys.

♦ ♦ ♦

Mrs. Grace M. Druecker now is managing the Indiana Products Co., Kokomo, Ind., suppliers of foundry sands, etc., in the absence of her son, **H. Joe Druecker** who is overseas as an ensign in the United States Naval Reserve.

♦ ♦ ♦

Clifford W. Schwenn, assistant superintendent, Caterpillar Tractor Co., Peoria, Ill., with which company he had been associated 13 years, has become general superintendent, Brillion Iron Works Inc., Brillion, Wis.

♦ ♦ ♦

Dr. Harold Moore, director, British Nonferrous Metals Research Association since 1932 has been awarded the platinum medal of the Council of the Institute of Metals, London. Dr. Moore who has had a long and distinguished metallurgical career, will receive the medal as one who has rendered outstanding services to nonferrous metallurgy. Following his training under Dr. J. E. Stead, Dr. Moore held metallurgical posts with industrial firms before joining the research department, Woolwich,

(*Concluded on page* 152)

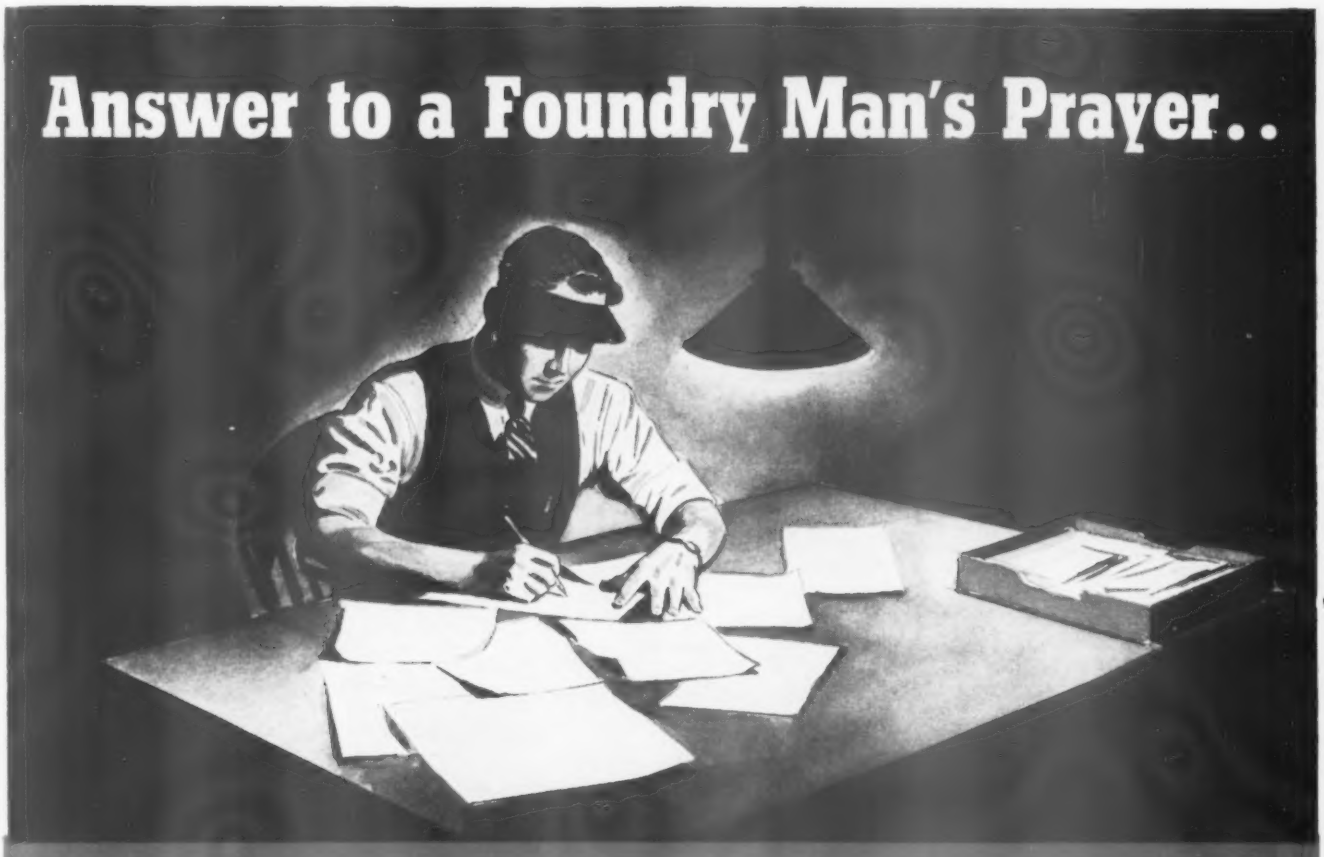
R. G. McElwee

Horace A. Deane

W. Scott Fraula

Douglas C. Williams

Answer to a Foundry Man's Prayer..



How to increase production with *PRESENT* equipment

Today the demand is for more and more production. And with it, the foundry man's problems increase... How to squeeze out additional units!... How to keep up with present schedules, *even!*

In shops and plants all over the country, Truline Binder is helping to show the way!

1. More Cores Per Hour. Because Truline is easy to handle and mix . . . because it produces an easy-flowing core-sand of low, green strength that rams *tight* quickly, it helps save valuable time.

And what's more, because Truline *fuses* (does not need air to develop the bond), baking times are sharply cut, thus further speeding up the production of sound, usable cores.

2. Ends Cleaning Room Bottlenecks. Because Truline burns out quickly, cores collapse completely, making clean-up a relatively simple and easy matter.

3. Another Advantage! Because cores fall apart before the metal cools, castings are free to shrink, thus largely eliminating danger of shrinkage-cracks.

For further information or a sample, fill in the coupon below. No obligation.

TRULINE BINDER

HERCULES POWDER COMPANY
INCORPORATED
999 Market St., Wilmington, Delaware

Please send ☐ sample ☐ information on how to use Truline Binder in casting:
(state type of work and kind of metal cast)

Name _____ Title _____
Company _____ City _____ State _____
Address _____ JJ-61

(*Continued from page* 150)

as chief metallurgist. He was director of metallurgical research from 1919 to 1932. Since that time he has held his present position with the British Nonferrous Metals Research Association.

♦ ♦ ♦

Bradley H. Booth, for the past 4 years, metallurgist, Jackson Iron & Steel Co., Jackson, O., has become foundry engineer, Carpenter Bros. Inc., Milwaukee. Prior to affiliation with Jackson Iron & Steel Co., Mr. Booth served as metallurgist with Illinois Malleable Iron Co., Decatur, Ill., and as chemist with Laconia Malleable Iron Co., Laconia, N. H.

♦ ♦ ♦

K. H. Hamblin, formerly of the Forgings and Castings Section, Steel Division, WPB, Washington, has resigned to become supervisor of foundries, Grinnell Co., Providence, R. I. Mr. Hamblin received his technical education at Rensselaer Polytechnic Institute, Troy, N. Y. where he acquired chemical and metallurgical experience in the laboratory of Enrique Touceda, consulting engineer, Malleable Founders' Society. Mr. Hamblin then spent a year as a field assistant to the consulting engineer of the American Malleable Castings Association. Leaving that work, he located at Providence, R. I. where for 10 years he was superintendent of the Rhode Island Malleable Iron Works. From 1934 to 1938 Mr. Hamblin served as general superintendent, Thomas Devlin Mfg. Co., Burlington, N. J. where he was in charge of all plant operations including malleable, gray iron, and nonferrous foundries and machine shops. Prior to his connection with WPB, he was general superintendent in charge of manufacturing, Keeley Stove Co., Columbia, Pa.

♦ ♦ ♦

J. R. Wark, since 1938 connected with the Queen City Sand & Supply Co., Buffalo, in the sale of foundry supplies and equipment, recently resigned to accept the commission of lieutenant junior grade in the United States Naval Reserve. Prior to 1938 Mr. Wark had been associated with the E. J. Woodison Co. for 15 years, the last two years of which were as branch manager of the company's Buffalo territory. He also has been active in the American Foundrymen's Association, and was secretary of the Western New York Chapter at the time he received his commission.

♦ ♦ ♦

Robert J. LaMarche, secretary, American Malleable Castings Co., Marion, O., has been made industrial specialist, Castings and Forging Section, Steel Division, War Production Board, Washington, succeeding **K. H. Hamblin,** recently resigned. Mr. LaMarche attended the University of Southern California, was graduated from Kenyon College, Gambier, O., and has been connected with the American Malleable Castings Co. since graduation.

♦ ♦ ♦

Harry E. Beane has been appointed sales manager, Bristol Co., Waterbury, Conn. **L. G. Bean,** has been promoted to vice president in charge of engineering and sales from vice president and general sales manager which position he has held since 1939. **E. L. Stilson** has been appointed assistant sales manager with headquarters at the general offices of the company at Waterbury.

♦ ♦ ♦

James A. Davis, former metallurgist, Colorado Fuel & Iron Corp., Pueblo, Colo., has been appointed to the technical staff of Battelle Memorial Institute, Columbus, O. where he has been assigned to metallurgical research related to the war effort. Mr. Davis attended Denver University and the Colorado School of Mines, receiving a degree in metallurgical engineering from the latter school.

♦ ♦ ♦

Edwin F. Nunemacher Jr. has become connected with the International Minerals & Chemical Corp., Austin, Tex., as alloy superintendent at the company's magnesium plant. Mr. Nunemacher formerly was employed as chief chemist for the Beryllium Corp. of Pennsylvania. He has served as consulting chemist, Textile Machine Works, Reading Hardware Corp., Gray Iron Foundry & Mfg. Co., all of Reading, Pa., and he also was consulting chemist for the Keystone Gray Iron Foundry Co., Pottstown, Pa.

♦ ♦ ♦

Ralph G. Detmer, general manager, American Frog & Switch Co., Hamilton, O., a subsidiary of the Taylor-Wharton Iron & Steel Co., has been elected vice president of the subsidiary company. Mr. Detmer has been connected with the company for more than 20 years.

♦ ♦ ♦

Dr. Alphonse Pechukas has been appointed research director, Columbia Chemical Division, Pittsburgh Plate Glass Co., Pittsburgh. **Dr. Franklin Strain** has been appointed assistant research director. Dr. Pechukas, who has been serving as acting director since May, 1942, first entered the company's chemical division in 1937 as a laboratory research worker.

♦ ♦ ♦

J. P. Enright has been appointed abrasive engineer for the Norton Co., Worcester, Mass. His territory will include Indianapolis and the vicinity. **Robert W. Crawford** has been appointed abrasive engineer for that company in the Pittsburgh territory succeeding **William A. Russell** who now is an ensign in the U. S. Navy.

♦ ♦ ♦

Ralph J. Oboth and **Fred J. Eisert** have acquired an interest in the Urick Foundry Co., Erie, Pa. Mr. Oboth formerly was associated with the Odin Stove Co., Erie, Pa., and for the past 19 years has served as superintendent of the Urick foundry. Mr. Eisert has been connected with the Erie Steam Shovel Co., Erie; Ingersoll-Rand Co., Painted Post, N. Y., and for the past 18 years has been foundry superintendent, Griswold Mfg. Co., Erie.

♦ ♦ ♦

Edwin S. Armstrong has been appointed manager for the Milwaukee District which includes the greater part of Wisconsin, of the W. W. Sly Mfg. Co., Cleveland. Mr. Armstrong's headquarters are at 7936 Rogers Avenue, Wauwatosa, Wis. He has been connected with the foundry industry for many years and has held executive positions in numerous foundries.

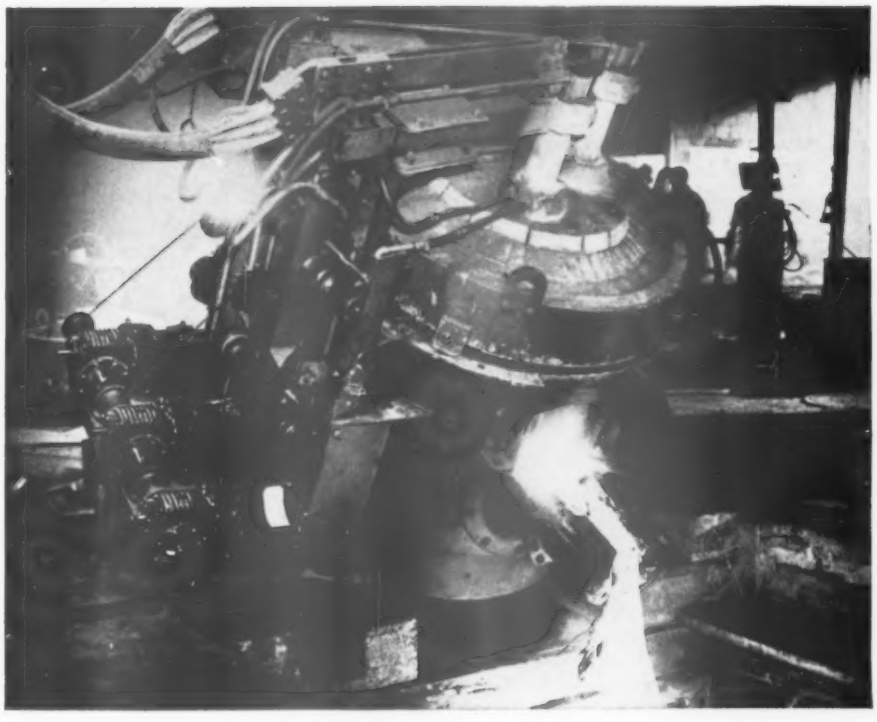
K. H. Hamblin

Robert J. LaMarche

Bradley H. Booth

J. R. Wark

Hit the Roof Lately?



. . . Use P. B. SILLIMANITE

Are you having trouble with short roof life on your Direct Arc Furnaces? If you are, now is the time to check the advantages to be gained by using P. B. SILLIMANITE roofs. These roofs are in service today on a variety of furnace sizes—from 50 lb. to 50 tons—melting a wide range of steels and alloys. Where the operating conditions are just too t-o-u-g-h for ordinary refractories P. B. SILLIMANITE is doing the job—at a definite saving in refractory cost per ton of metal, even though the initial cost is higher.

Let's look at the record and see why P. B. SILLIMANITE refractories fulfill the service requirements.

ESSENTIAL PROPERTIES	P. B. SILLIMANITE
1—Softening point above 3100°F.	1—P. C. E. of Cone 38—3335°F.
2—High Hot Strength	2—Being a relatively pure, crystalline compound of alumina and silica, stabilized as mullite (3 Al203 : 2 Si02), there is no gradual softening below the critical point.
3—High Spalling Resistance	3—No loss in standard ASTM Panel Spalling Test for Super-Duty Fire Brick—a product which is designed for high spalling resistance. No abrupt volumetric changes.
4—Chemical Stability	4—Relatively insoluble in most slags and glasses, particularly those which are high in lime and alkalies. Attacked by high iron slags, but more slowly than fire clay base or other high alumina refractories. Low permeability—not readily affected by furnace gases.

Either P. B. SILLIMANITE Ramming Mix or Brick and Shapes are supplied for the roofs of the smaller furnaces—1,000 lb. and under. Brick and Special Shapes are recommended for the larger roofs. Write today for your copy of Bulletin #311 and other interesting data.

CHAS. TAYLOR SONS Co.

MANUFACTURERS OF REFRACTORIES • CINCINNATI • OHIO • U. S. A.

the adventures of BILL

BY PAT DWYER

Drawings By RICHEY

ABOUT this time every year I overhear scraps of conversation touching on flowers, vegetables, fertilizers, drainage, pruning, grafting, the phases of the moon and the weather probabilities as gleaned from the extremely sketchy weather reports in the upper left corner of the front page in the morning paper. A broad hint was dropped the other night that it might be a good idea for some person to take the lawn mower apart and spill a few drops of oil here and there in the chassis and running gear. The noise of the thing last fall was positively annoying and besides, the hinter was quite sure that—er—whoever was going to cut the grass this summer would derive more pleasure from pushing a quiet, easy running machine, than he would from puffing and panting behind an old rattle trap as stiff and creaking and rusty as some people who never indulge in proper spasms of exercise.

Through one subterfuge or another I ignore all or practically all this collected and fiendishly concerted effort to convert me into a camel or mule or other beast of burden. If I cannot shift the conversation into more cheerful and congenial channels, I become deeply engrossed in a book, or pretend to be asleep. In February and March I can proclaim boldly that only a nitwit would display the least interest in gardens and garden tools. To back up this reasonable and carefully considered opinion I have only to quote Bill's old uncle Malachi " 'Tis time enough an' bedad wid plinty to spare, to shake hands wid the divvle when ya meet him." I always have considered that this version is an improvement on the ordinary and for that reason better known "Don't cross your bridges until you come to them".

I regret to admit that my admiring opinion of the sage is not shared by other members of the family. On more than one occasion I have been told—politely of course, but firmly—that I would confer a favor on all and sundry by omitting all reference to the old doddering reprobate and ex-fenian, his views, opinions and obnoxious vocabulary at least in the presence of the grand children whose dear little innocent minds are like sheets of sticky fly paper. They catch and retain everything with special attraction for words and phrases omitted from the dictionary and nearly all publications with the exception of high class and really popular fiction.

By the beginning of April, the garden situation assumes a more acute and—shall we say—threatening attitude. Tender little green shoots poke their inquisitive noses above the ground. Apparently dark and withered limbs on trees and shrubs show signs and portents of the great annual miracle of new life. Pioneer members of the great bird host that disappeared toward the South several months before, occasionally are seen prowling about in search of home sites and incidentally seeking enough food to hold body and soul together. This year with everything rationed from tires to turnips and from safety pins to sugar, the dear little feathered friends will have opportunity to indorse General Sherman's pithy reference to war.

Instead of gaily whistling a joyous roundelay to the rising sun, we may expect—if we are up and around at the time—and if we are skilled in the language of birds—to hear one black bird mutter sourly to another "Dat day Gin'al man shoo bit off a mouthful when he said wah wuz what it wuz." Mrs. Blackbird agrees whole heartedly, "Yaas," she twitters viciously, "an' dat's de same place all dese ginks whut sta'ts wahs is headed foh! Praise de Lawd an' pass whut little ammunition dey is, big boy."

Bill showed little sympathy when I complained of the dismal prospect where I should be chained to the shovel, the hoe and the lawnmower all summer like a galley slave chained to the oar. I doubted very much that the old iron frame would stand up to the cruel ordeal.

All set for the Spring offensive

"A fine, fat galley slave you would make," Bill scoffed. "You may and probably had a little iron in the frame when you worked ten hours a day in the foundry and breathed an atmosphere impregnated with sand dust and iron dust from the open work tumbling barrels in one end of the shop. That accumulation has worked out of your system long ago. As for the galley slave stuff, I don't say but a few months on the job might restore you to the shape of a human being. The garden would do the same thing if you applied yourself diligently. How can you apply yourself diligently when you are hopping from one end of the country to the other end all the time like a blinking grasshopper? You'll be off to St. Louis in a couple of weeks to the annual convention of the American Foundrymen's Association, just at the time you should be out rooting up the ground and burying the seeds for potatoes and cabbage and crocuses and daffydowndillies.

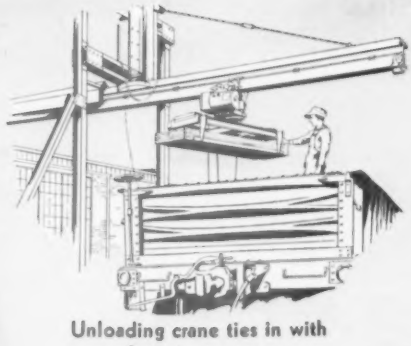
"And that reminds me," he continued, hopping nimbly from one subject to another. "That reminds me that I had a letter the other day from an ex-molder, temporarily enjoying a rest in an old soldier's home on the West Coast. He uses his own spelling system and if his spelling does not agree with that of Mr. Webster, why, that is just too bad for Mr. Webster."

"An isolationist, eh? Is he a friend of your's? Did he have any excuse for writing except to keep his hand in, and to enjoy the feeling of perfect freedom and independence which only comes to a person who knows he is breaking all the rules?"

"Pon my word," said Bill. "You should be in the Senate or House of Representatives where the practice of wasting time by asking irrelevant questions has been raised to a high and holy art. What possible difference does it make to you or me who this bird is, or what reason he had for writing? As to his being a friend of mine, that is one of these questions to which I regret to say I cannot give a direct yes or no answer. I do not know him personally, but from the fact that he voluntarily wrote and sent me a letter, I think we safely may assume that he is not hostile. I do not know whether he uses his right or his left foot on a spade 'down in the gyarden where the praties grow',

(*Continued on page* 156)

Simple hand pushed equipment makes up efficient charging system.



Unloading crane ties in with plant storage area.

Racks handle finished parts through drying ovens.

FOR THE DURATION AND LONG AFTERWARDS

American MonoRail Equipment offers versatile application without costly adjustment or lengthy engineering.

YOU can better your production NOW—later in the post-war period you will have essential equipment available for changes in product or process.

American MonoRail handling equipment is extremely flexible. Standard parts fit quickly and easily into complete systems that solve a wide range of handling problems.

Don't let your handling problems impede your war work. Let our engineers show you how to speed up NOW with an eye on easy, inexpensive adjustment when Victory is ours.

Stripping crane speeds up removal of wire coils.

Crane over storage area moves steel easily.

THE AMERICAN MONORAIL CO.

13104 ATHENS AVENUE ★ CLEVELAND, OHIO

(*Continued from page* 154)

but that is a point lost sight of by men who have worn the uniform, shared dangers and privations, and marched behind their country's colors.

"This honest gent I am trying to tell you about has a heart of gold even if he does throw a wild pen. In proof of the first statement I only have to mention that he is a steady reader of THE FOUNDRY. This letter which you observe I hold firmly between the index finger and thumb of the left hand, and which I shall translate for your benefit may be accepted as satisfactory evidence in the second clause of the indictment. He was prompted to write after he read some drivel you printed in THE FOUNDRY one time about the trouble you had with door and window screens. Listen:

Hiya Bill: Just read the Artical about hanging the doar and winda screens and ive Concluded you need a tip or two on some things. Why people put up screen doars and windas to keep the flys out is a mistery to me. I think myself that screin doars and windos are nothing but a noosence to the fella who puts em up and even more of a useless noisance after they ar put up. The Flies that are on the inside cant get out and those on the outside cant get in. The hole thing is a lot of bolony. Now here is a good Idear to keep Flys on the outside where they belong same as all other Pests like bums and stray Cats and people who want to sell you stuff you dont want and never did want and probably never will. You dont see nobody coming around pedling tires nor coffee nor sugar and stuff. Heres the Idear.

First go to a Fish Store or maybe down to the Beech if you have a beech near your place. Collect a few Fish Heds. The Older the Better. Something in the A-1 Able and Strong class, fit for combat duty. Put them in your nabors yard. The fella that keeps you awake all night with a sqawking radio afflicted with an over dose of statick, or the other fella on the left practicing on the saxifone. Deposit the Fish heads in a nice sunny spot where it will do the most good and verily my Son therel be a Bargain rush of Flys Xit thru the doars and theyl forget your address and never come back no more, no mo like that song about the rain.

Well Bill I suppose you are about all set for a gander down to Saint Looey for the foundry convention some time about the end of April. I must have my sekatary look up the date. Times and one thing and another beeing what they are I dont think Ill make it this year. I dont suppose none of the old Gang aint around there no more in the Missourah Malleable, the Fulton Iron Works or the Commonwealth out in Granit City. If you happen to bump into any of the old Gay Cats givem my regards. See if you can find out whatever became of Johnny Murtaugh. I lost track of him Years ago. A good lad and active in the Movement, but he sure was one gabby guy. If you happen to go down by the great Stone building of the Anhowserbush, just pat the corenr stone for me for old Time sake. I guess me and a lot of other fellas contributed our mite toard the expense of laying it ha ha.

Well Bill, I hoap you don't wear your dogs out in Saint Looey. I hoap this convention turns out better than some of the Molders conventions ive been at with Sore heads and sick Stomacks the next day not to menchen the Holes that were burnt in the Floars and Rugs with spills, blowups and Runouts. Some of the castings were positive superdoopers. The Gaffer used to say that on the outside these birds could make anything from the size of a Dime to the front end of a Battleship and when they worked for him he wouldnt trust em to make a doar latch for one of Chic Sales telephone booths.

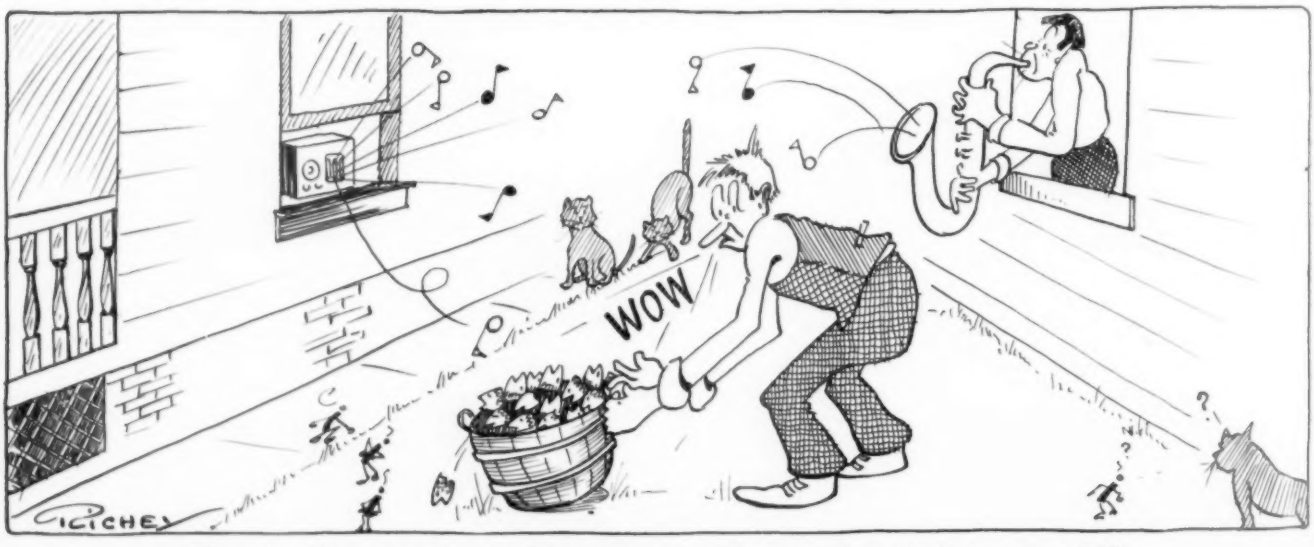
Well, Bill, I gess that will be All for now, so keep yer fingers crossed and dont get mixed up in no overtime jobs and I sure hoap the Hotel dont ketch fire when the gang drops the bottom.

"That reference to dropping the bottom," Bill continued, "reminds me of an inquiry I had recently from a man who wrote that he had a small foundry in which a 32-inch cupola has a capacity of 5 tons per hour. He has the opportunity of bidding on a considerable tonnage of castings ranging in weight between 1500 and 3500 pounds. He has no assurance of any repeat orders of this kind and probably will have to return to the production of his usual line of small castings. He would appreciate my opinion on whether he could handle the order with his small cupola, or should he install a large cupola, say 60 inches diameter.

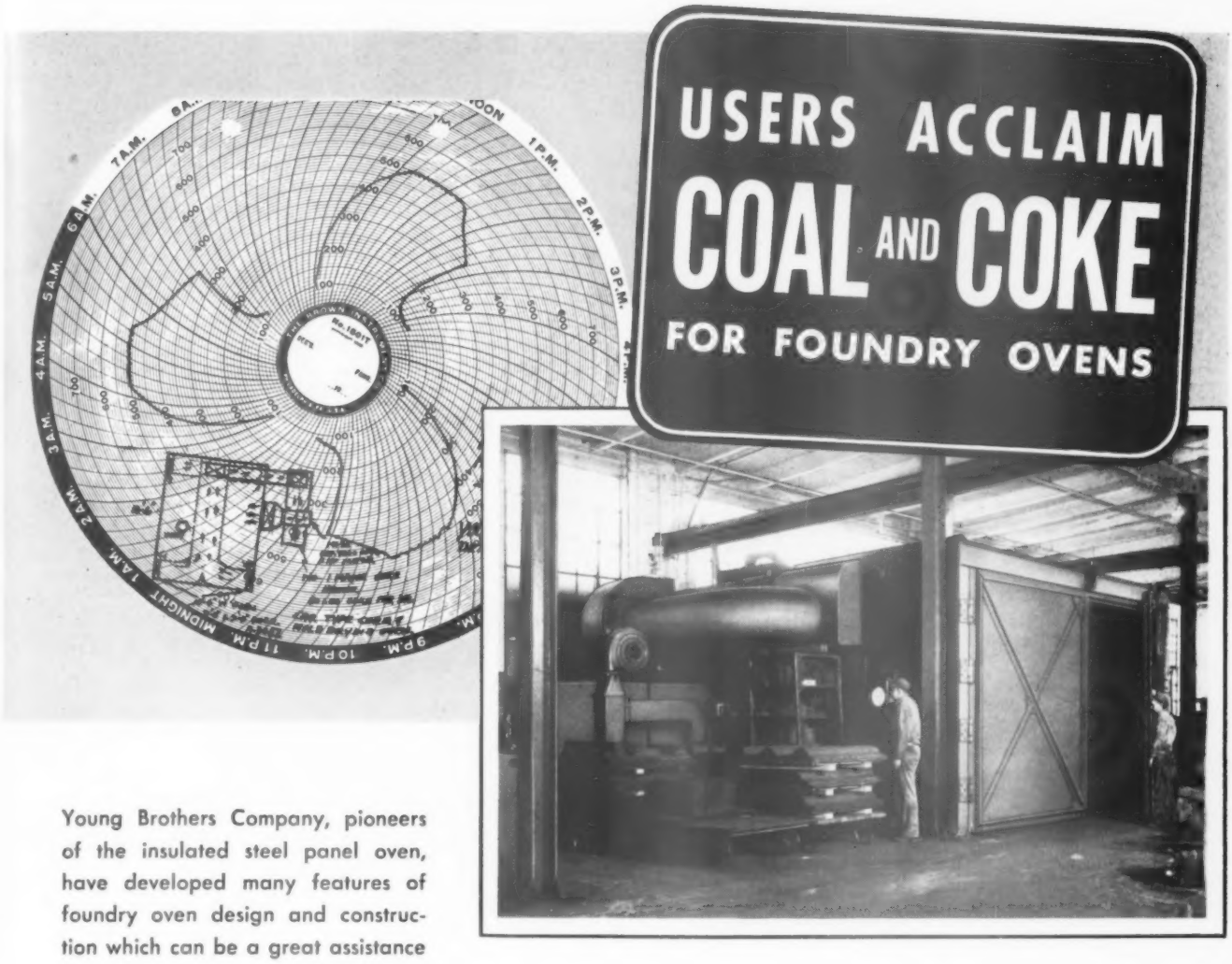
"In my reply I pointed out that I should need more information before venturing a definite opinion. His present cupola in which he states he can melt 5 tons per hour is large enough if he only intends to make 6 or 7 tons of castings per ordinary working day. He can fill a 2-ton ladle in about half an hour. With a hot, dry ladle and a light covering of charcoal the metal will remain hot enough for all ordinary purposes. In the event he has the floor space and is in position to work his men over time, or on a double shift, the cupola can be kept in blast from say, noon to 10 or 12 at night. Where the bottom is dropped before midnight, the lining can be repaired early in the morning for the next day's heat. However for a long heat like that, he will need practically a complete lining each day at the melting zone. Incidentally, I mentioned that if he is knocking 5 tons per hour out of a 32-inch cupola he has nothing to learn about cupola operation. The usual production from a cupola that size is between 3 and 4 tons per hour. Also the cupola must be slagged properly to stay in operation more than 2 hours.

"Under present conditions another feature seems worthy of mention. If he decides to get another cupola, large or small, has he any idea where or when he can get the cupola or the motor and blower to run it? Has he the floor space, the flask equipment and the men required to make enough molds to absorb the output of a large cupola, say

(*Concluded on page* 226)



Illustrating the more or less familiar sporting term Playing Both Ends Against the Middle



Young Brothers Company, pioneers of the insulated steel panel oven, have developed many features of foundry oven design and construction which can be a great assistance to you in coping with today's shortages of the scarcer fuels.

If both oven and heating unit are properly engineered and competently constructed there is no penalty in the selection of coal or coke as a fuel for foundry ovens. In fact, many solid fuel fired core and mold ovens in service are doing just as satisfactory work as those heated by oil, gas or electricity. Baking temperatures are accurately controlled, bakes are fast, and the baked cores and molds are entirely uniform.

Here's what present users of Young Brothers foundry ovens have written about their installations.

"It is an eye-opener to us as we hardly expected such accurate control of a coke fired oven. As intimated in our previous letter, we think this performance is almost perfect."

"We get more uniformly baked cores than from our older ovens and much less attention is required. Tending the fire is not the punishing job it is with a pit type fire box."

"The plant engineer was pleased with the baking—3-hour bake at 350 deg. F. The coal stoker works O.K."

"It works fine—practically no rejects due to bad cores—it saves money—our old oven is now idle."

"We are elated with results and can boost both your ovens and your organization."

"Results excellent; high efficiency;—your oven represents one of our most profitable investments."

Young Brothers Company has been building coal and coke fired foundry ovens for a great many years.

YOUNG BROTHERS COMPANY
6505 MACK AVENUE • DETROIT, MICHIGAN

Among DETROIT Foundries

BY A. H. ALLEN
Detroit Editor,
The Foundry

FOUNDRY activity in the Detroit area, and all of Michigan for that matter, was connected intimately with the needs of the automotive industry, until the fateful day of Pearl Harbor. In the main, they have gone far afield as a result of war demands, and regularly are turning out castings now which do not have the remotest resemblance to things automotive. It is pertinent to examine the matter of whether foundries will some day hence be back in their old channels.

A consideration of the postwar picture for foundries must be shaded by the postwar outlook for automobiles. There can be no quibbling with the forecast that the demand for cars and trucks will be strong when it is possible to resume production. As a matter of fact the demand probably will be so strong that some form of allocation or rationing of the product will be necessary to avoid an excessive orgy of production that might only result in another serious depression. One estimate is that by 1945 there will be a deficiency of 11,200,000 motor cars, or about 2 full years at the best pace the industry ever registered.

War Demand Paramount

There is thinking in Washington now on the possibility of some limited resumption of essential civilian production (maybe motor cars?) before the termination of the war. Naturally there is not much talking about this viewpoint, since there is still an 80-billion dollar production job on war equipment to be handled this year. But it illustrates that some officials are looking ahead to the time the military equipment "pipelines" are filled and the only requirements from industry will be losses in battle or attrition requirements.

Such losses obviously will be far below the volume of war production now feeding out from industry. The result is that industry shutdowns might impend. To avoid this the logical move is to resume production to the degree that materials and facilities permit. Whether this would include automobiles no one can say for certain, but it must be recognized that the automobile is unquestionably an essential phase of the transportation requirement of the country, and the "attrition" of cars now on the roads is moving up at an alarming rate.

One authoritative survey reports that 2,000,000 cars went off the roads in 1942, leaving in December in the entire country 28,553,945 passenger cars and 4,378,780 trucks in service. Another two or three million taken off this total might bring a critical situation in some areas, crucial to the point where replacements or at least an appreciable improvement in the repair parts supply would be demanded.

New cars impounded by government freeze orders gradually are being released to certain selected groups, but even some of these have deteriorated in storage and all of them carry a premium price to the buyer because of storage charges. Another sore point is the damage now being wrought to automotive equipment in service as the result of serious inroads of wear and weather on streets and highways. In the Detroit area alone, the rough winter has cracked up paved roads everywhere, leaving ruts and chuckholes which can only chew away tires and wear away chassis and supension systems.

Adopt Standard Model

It seems reasonable to assume that if perchance as time wears on a resumption of a certain amount of automobile production were permitted, it would be centered on some standard type of model or models—say one Ford, one Chevrolet and one Plymouth. This would be treating the Big Three equitably, and what squawks the independents might make could be softened by an increase in their share of the war production load. Or the independents might jointly design a standard model and produce it cooperatively under some such name as Hudstupackashlys to recognize Hudson, Studebaker, Packard, Nash and Willys.

From the foundry standpoint, the Big Three would have no great difficulty in getting some cylinder blocks, heads, flywheels, transmission cases and the like. Chevrolet's gray iron foundry in Saginaw, a portion of which has now been converted to production of magnesium casting, would not have too much trouble in reconversion. The Dodge foundry in Detroit could take care of Plymouth. Ford, with its vast expansion of foundry projects, certainly could squeeze in some automotive requirements without too much disturbance.

At any rate, when new automobiles are built again they will be counterparts or standardizations of the last of the 1942 models. The flossy new stuff will have to wait until the coming of peace and until the immediate rush demand for automobiles has been partly satisfied at least. No smart car builder is going to defer production until radical new designs and materials changes can be assimilated, which might take anywhere from a year to 2 years.

Looking to the more distant future, there are three factors which will influence the concept of the eventual postwar car: Speed restrictions, material costs and the extent of monetary inflation. If a national speed limit of, say, 45 miles an hour is established, then the day of the high-power automobile engine is done and engineers can move toward lopping off 500-1000 pounds from the weight of the average car. If the cost of aluminum and magnesium are pushed down to the present level of iron and steel, then they will prove attractive alternate materials, but obviously the iron and steel interests are not going to stand by idly and see their markets disappear this way. Monetary inflation is of course closely allied with materials and labor costs and must be taken into account in designing, tooling and building a car which will sell.

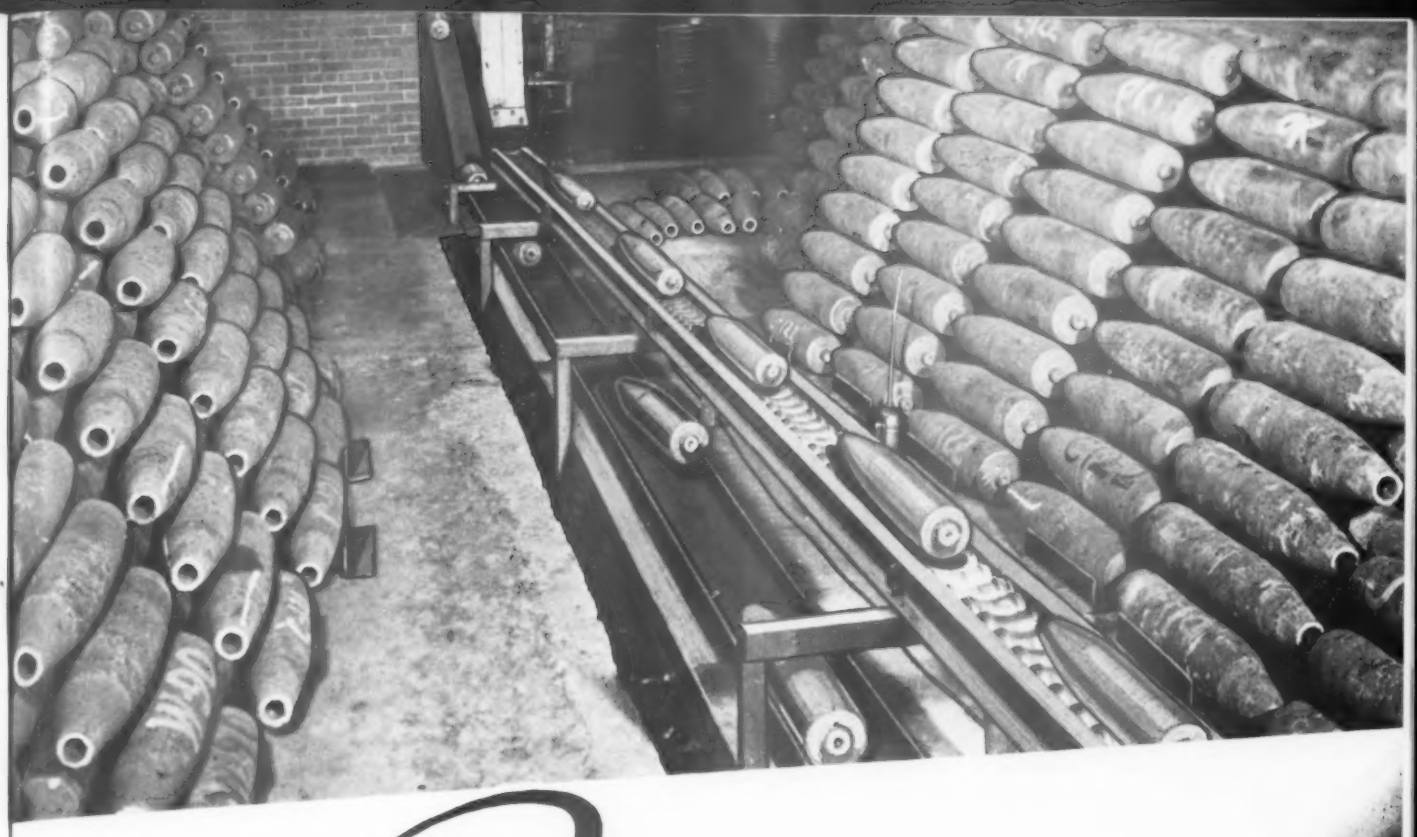
Compare Two Tanks

One of the newest tank-automotive items to emerge from the "classified" status is the M-10 tank destroyer, currently being built in the arsenals which assemble medium tanks. It is an evolution of the M-4 tank; in fact is the chassis of the M-4 with a special superstructure and turret in which a high-velocity 3-inch gun is mounted. Upper section of the hull carries a series of studs or "buttons" to which extra armor plate can be bolted if it is desired to reinforce the structure in combat.

It will be interesting to compare battle experiences of the two principal versions of the M-4 medium tank, one of which has principal sections of cast armor plate and the other of rolled and welded armor. Both are now in action, but the army is keeping to itself any reports on how the two compare in service.

In connection with the switch from rubber to metallic tank treads, the United States Rubber Co., Detroit, has been permitted to announce that it has leased four buildings and the power house of the Hupp Motor Co. Much of the space has now been converted to production, and parts for the running gear of light

(*Concluded on page* 161)



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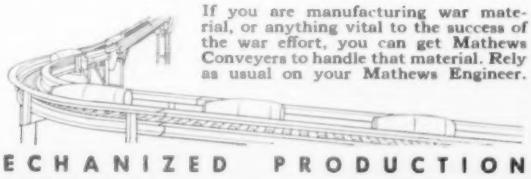
In your plant, if there is any lag in moving materials to and from men or machines, perhaps a Mathews engineer could point the way to improving this condition.

Mathews Conveyers are available for critical war materials . . . there is no surer way to shorten the war than to speed Victory at its source!



If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

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Self-aligning stripping mechanism automatically insures perfect pattern draw throughout that operation and compensates for wear on squeeze piston, which does not side-shift or "cock". Mechanism is controlled by exhaust port arrangement equipped with needle valve, which gives any desired speed *uniformly*, conserving molder's time and attention for other work.

Foot-operated jolt valve controls jolting operation. No time is wasted by molder opening and closing hand-operated valve. Both hands are free to spread sand around flask while jolting.

Few operating parts, shielded to keep dirt out of pistons, even at maximum squeeze stroke.

Rapid and husky, the SPO No. 200 Series reduces maintenance to a negligible factor. You get more accurate molds with less effort, which means more molds. May we tell you more about these speedy production machines?

SPO designs and builds both molding machines and pattern equipment and guarantees every installation to be in full accordance with your specifications.

Note the clean, simple design of the under-structure.

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(*Concluded from page* 158)

and medium tanks already are being turned out in volume. Improved methods of manufacture of parts have been developed and are in operation. One important process takes only a third the time originally needed, and at the same time saves 10 per cent on material.

Wilson Foundry & Machine Co. in Pontiac is supplying an experimental lot of cylinder block and other castings for a 6-cylinder L-head engine to be built by the Tucker-Higgins Co., Ypsilanti, Mich., for use in landing boats being built by the Higgins interests. If the first group of engines to be built proves successful, production operations will be moved to a location in one of the southern states.

Bohn Aluminum & Brass Corp. has organized a new division known as the Aluminum Refiners Division to specialize in refining of aluminum scrap into aluminum alloy ingot, a move made necessary by the tremendous bulking of supplies of all types of aluminum scrap in various nearby manufacturing plants. The new plant began operations last month and is managed by Ernest Bell.

New Aluminum Cylinder Head Plant Opened

An inspection tour was conducted through the new plant of the National Aluminum Cylinder Head Co., Cleveland, when operations were started recently. Shown in the illustration is Frank J. Lausche, mayor of Cleveland, pouring a casting

Canadian Company Moves Office

Whiting Corp. (Canada) Ltd., Canadian subsidiary of the Whiting Corp., Harvey, Ill., has been moved to 45 Richmond Street, West, Toronto, Ont., Canada. The Canadian organization will be in charge of H. M. Rowlette, recently elected vice president and general manager, succeeding Col. James Mess, who is now devoting full time to Government duties in Ottawa. Mr. Rowlette has been with the parent company at Harvey, Ill. since 1912 and for many years was in charge of purchases and stores. Alex Ritchie will serve with him as assistant general manager.

H. T. Doran, 515 New Birks Building, Montreal and W. Bruce Campbell, 628 Royal Bank Building, Winnipeg will continue as sales representatives of the Canadian company.

Chicago Organization Wins Army-Navy "E"

Lindberg Engineering Co. received award of the Army-Navy "E" for excellence in war production in ceremonies at its plant in Chicago, Feb. 26. Shown, left to right in the accompanying illustration, are those who participated in presentation of the pennant and buttons to the company's 650 employes: L. A. Lindberg, president of the company; Hon. Edward J. Kelly, mayor of Chicago; Rear Admiral Alex M. Charlton, inspector of naval material in the Chicago district; Read Admiral Wat T. Cluverius, U. S. Navy retired; and Maj. Lauris Eek, Sixth Service Command

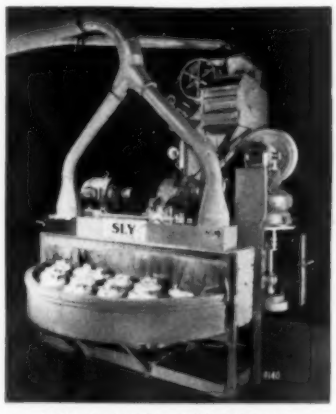
Chart Aids Flame Adjustment

A new chart for oxyacetylene flame adjustment is being offered by Air Reduction Co., 60 East 42nd street, New York. The chart shows natural color photographs of five fundamental flame adjustments: Acetylene burning in air; a strongly carburizing flame; slight excess of acetylene flame; neutral flame; an oxidizing flame. Desired quantities may be obtained on request to the company.

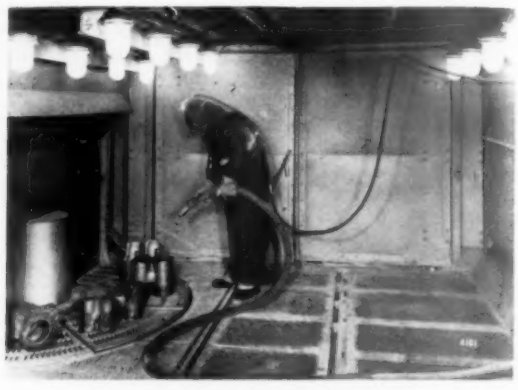
American Society for Testing Materials has published a 160-page book containing 23 specifications and tests on electrical heating and resistance, alloys developed by its Committee B-4. In addition the book contains 4 technical papers on thermostat metal, methods of testing thermocouples and thermocouple materials, electrical surge tests on contact materials, and contact testing machines. Copies of the book may be obtained for $1.50 from headquarters of the society, 200 South Broad Street, Philadelphia.

WHEREVER YOU ARE . . . .

★ SEATTLE

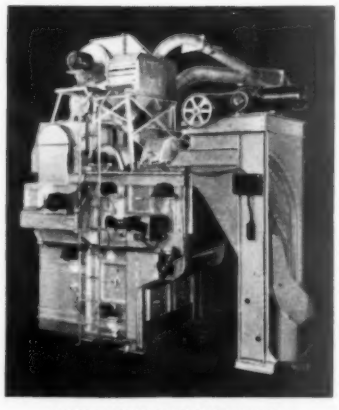


SLY AIRLESS BLAST TABLE



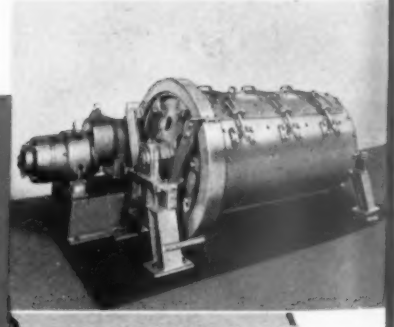
SLY BLAST ROOM

SLY DUST FILTER



SLY CENTRI-BLAST MILL

★ LOS ANGELES



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Speakers' table at the annual conference of the Birmingham District Chapter of the A.F.A. showing left to right: Earl L. Shaner, president, Penton Publishing Co., Cleveland, speaker; E. A. Thomas, Thomas Foundries Inc., Birmingham, chairman of the chapter; and Warren Whitney, National Cast Iron Pipe Co., Birmingham, toastmaster. Photo courtesy of Birmingham News

Birmingham HOLDS ELEVENTH ANNUAL CONFERENCE

DISCUSSIONS of war influences on industry dominated the eleventh annual foundry practice conference of the Birmingham district chapter, American Foundrymen's Association. Held at the Tutwiler hotel, Birmingham, Feb. 19, the conference included three technical sessions followed by a banquet, and attracted approximately 400 members and guests. E. A. Thomas, president, Thomas Foundries, Inc., Birmingham, and chapter president, presided at the conference.

A typical example of the resourcefulness and adaptability of the American foundry industry in contributing to the war effort was disclosed in a talk at one of the technical sessions by W. D. Moore, president, American Cast Iron Pipe Co., Birmingham. Mr. Moore described the manner in which his company changed its operations gradually from the manufacture of cast iron pipe for peacetime use to the production of numerous ordnance items.

With the initial impact of war work, American Cast Iron Pipe Co. was in the process of erecting a new plant, but eventually the added facilities were absorbed by the steadily growing volume of war production. In a short time output embraced machine tool castings, die pot liners, centrifugally cast steel propeller shafts, diesel engine cylinder liners, numerous annular parts for tanks and a host of other new products.

Of special significance was the fact that this conversion to new products and new operating practices was accomplished in the face of expanding output. Before the war the company had been geared to a yearly production of 100,000 tons of pipe and fittings, but it turned out 200,000 tons of all products in 1941 and 225,000 tons in 1942.

Another significant point brought out by Mr. Moore was the company's attempt to utilize the maximum of its available manufacturing skill. At one stage of the conversion process the company was furnishing a relatively simple tank part. Later it contracted to make a product involving rather intricate problems of technique and control. With increased demand for the latter item, the company tapered production of the simple part and threw additional resources into the more difficult job.

Lieut. R. W. Sandelin, Birmingham Ordnance District, discussed "The Role of Iron and Steel Castings in Ordnance Material" at the opening technical session, describing various casting applications in war equipment. Discussion was led by Dave Booker, National Cast Iron Pipe Co., Birmingham.

A talk on "Research and Development of High Grade Refractories" was given by R. A. Barr, Carborundum Co., refractories division, Niagara Falls, N. Y., at a second session presided over by C. K. Donoho, American Cast Iron Pipe Co.

The conference adopted a resolution directed to OPA asking that immediate steps be taken to allow purchase of safety shoes by workers in essential war industries without surrendering a ration coupon. The resolution emphasized that the interest of safety requires such shoes to be worn for the protection of war workers.

Earl L. Shaner, president, Penton Publishing Co., Cleveland, publishers of THE FOUNDRY was the principal speaker at the annual banquet. Warren E. Whitney, manager, Birmingham plant, National Cast Iron Pipe Co., and president of Associated Industries of Alabama, was toastmaster. Mr. Shaner was introduced by L. N. Shannon, Vice President, Stockham Pipe Fittings Co., Birmingham, and a director of the national association.

Effective production—getting all components of war weapons to the right

(*Concluded on page* 166)

PRACTICAL DATA FOR PRESENT PROBLEMS

Here are two books designed to help users of Molybdenum steels and irons to conserve all alloying elements, and possibly steel and iron, by getting the most in the way of strength, toughness and wear resistance with the lowest alloy content.

"MOLYBDENUM IN STEEL" covers the fundamental metallurgy of Molybdenum steels. Heat treatment – physical properties – applications – of a number of these steels are treated at length.

"MOLYBDENUM IN CAST IRON" covers the effect of Molybdenum in gray iron, giving suggested analyses for practical applications and detailed discussion of high strength (60,000 p.s.i. and up) irons.

Both books will gladly be sent free on request.

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MOLY

Approximately 400 members and guests of the Birmingham Chapter attended the eleventh annual conference. Photographs courtesy of William McCulloch, American Cast Iron Pipe Co., Birmingham

(*Concluded from page* 164)

places at the right time—is the principal task facing industry today, Mr. Shaner told his audience. Industry has done a good job in raising war production to five times the November 1941 rate, but to achieve its goal it must have increased efficiency in management and find a cure for the absenteeism of workers. The latter condition, he said, is not necessarily traceable to unions. As one corrective measure for absenteeism he urged that workers be impressed with the importance of their jobs to the war effort.

The manpower problem, Mr. Shaner pointed out, at least is getting out in the open, and while solution may be deferred for several months, the only immediate cure is a continuation of the ingenuity and resourcefulness which has characterized American industry during the war to date.

Although decrying the political aspects of the "world of tomorrow," he urged industrial management to study the problems that will come with victory and peace and to plan for postwar production.

Americans are beginning to realize that the federal government is becoming top-heavy in centralized power, and there are increasing indications of a determination to make the necessary corrections to balance the scales with a return to traditional sanity, Mr. Shaner added.

R. E. Kennedy, national secretary of the American Foundrymen's Association, spoke briefly at the banquet, complimenting the Birmingham chapter on its growth and activities since its organization in 1931, and outlining the work of the A. F. A. in its service to the foundry industry.

Machine Tool Maker Awarded "E" Flag

Delta Mfg. Co., Milwaukee, was awarded the Army-Navy "E" for its production record of machine tools. Representing the government at the award ceremonies were Col. S. J. Otjen, Lieut. Commander D. M. Curry and Frank W. Gruesel of the War Production Board. An unusual feature of the presentation was the discovery that Hans Jaeger, Delta's oldest employe in point of service, had received a similar award at the Rock Island Arsenal 24 years ago during the previous World War.

Observes Hundredth Anniversary

To commemorate the birth of Sir William Chandler Roberts-Austen on March 3, 1843, a lecture on his life and work was given by Dr. S. W. Smith, March 3, at the Institution of Mechanical Engineers, Storey's Gate, SW1. The lecture was arranged and sponsored by the Institution of Mechanical Engineers, the Iron and Steel Institute and the Institute of Metals.

Sir Roberts-Austen was an honorary member of the Institution of Mechanical Engineers and he conducted a series of researches for the alloys research committee of the Institution. He was a past president of the Iron and Steel Institute and his name is perpetuated in the literature of ferrous metallurgy by the word, "austenite."

Dr. Smith, who in 1914 wrote a book, *Roberts Austen; A Record of His Work*, and who acted as Sir William's private assistant at the Royal Mint, was well qualified to deliver the centenary lecture.

Brushes Exhibited

Approximately 70 distinct types of brushing wheels have been assembled for a permanent exhibit in the Smithsonian Institution, Washington, by Osborn Mfg. Co., Cleveland, manufacturer of industrial brushes. The exhibit shows the development of brushing wheels during the last 50 years and also shows how the brushes are constructed. Three general forms of brushes are displayed—radial, cup and end brushes. These are designed to be rotated on chucks, headstocks, grinding heads, power hand tools or flexible shafts.

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Dear Sandy:

At a githerin' o' foundrymen th' ither day, this bit o' truth gang hame t' all of us. The speaker was tellin' o' core oils. "To be gude, they must hae several important characteristics," sed he.

(1) Core oil must not gum up boxes or give off noxious odors. (2) Core oil must produce a core of any desired tensile strength and surface hardness, without closing interstices, thereby retarding the flow of gas. (3) The baked core collapses readily after metal has solidified and should not create excessive gas during pouring. (4) Above all, core oil must be strictly uniform in quality and its cost should be measured as cost-per-ton-of-sand mixed to produce satisfactory cores and castings.

This caused me to straighten up for all Certified Core Oils have these important properties. It takes special core oil formulas to produce best results in given foundries, because of the variation in core sands, metal used and the thickness of the castings; hence, I insist that "core oils must be prescribed". Prescriptions have provided many foundries with a new low cost per ton of sand mixed, reduced cleaning costs, made workers more contented and, incidentally, built our present 350,000 gallon plant.

A prescription from the Core Oil Doctor will cost you nothing, but will definitely save you money and core trouble. All you need do is inform us fully of the shortcomings of your present core oil, together with your oil-to-sand ratio, type of sand used, oven heat employed and whether you use any other type of binder.

HERE IS THE ANSWER TO YOUR QUESTION: "Should water be added to core sand before core oil, or vice-versa?"

The desired amount of water should first be added to the sand, to partly saturate the grains and fines. This will result in a more even spread of the oil itself, and that will produce stronger cores since the oil doesn't soak into the fines. But, when cereal binder is employed, it should first be added to the dry sand, then add the water. And, lastly, add the oil. Our laboratory and foundry tests have proved consistently that uniform results and stronger cores result when ingredients are mixed as stated.

Wi' a muckle o' happy days,

Scotty Waugh

"The Core Oil Doctor"

P.S. Our staff will be in St. Louis for the Convention. Phone inquiries to Handlan, Inc. Main 0231

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View of the group present at the banquet held during the Wisconsin Chapter's sixth annual foundry conference

Wisconsin HOLDS SIXTH CONFERENCE

INTENSE interest in the foundry and its problems was clearly demonstrated by the excellent attendance at the various technical sessions held at the sixth annual foundry conference sponsored jointly by the Wisconsin Chapter of the A.F.A., and the University of Wisconsin. Approximately 700 attended the 2-day meeting. The conference was held at Hotel Schroeder, Milwaukee, on Feb. 18 and 19, and the program was prepared by a committee headed by William Hambley, Allis-Chalmers Mfg. Co., chairman; John Bing, A. P. Green Fire Brick Co., co-chairman; Dr. J. F. Oesterle, University of Wisconsin, associate chairman, and R. E. Shorey, University of Wisconsin, associate chairman.

The conference was opened Thursday morning Feb. 18 with the showing of two motion pictures. One entitled "Sand" was prepared by the Whitehead Brothers Co., Buffalo, and the other "Melting and Pouring" was prepared by the Modern Equipment Co., Port Washington, Wis. A luncheon followed at which Dr. J. F. Oesterle presided. He introduced F. E. Johnson, dean of the College of Engineering, University of Wisconsin, who gave the address of welcome. Dr. Clarence Dykstra, president, University of Wisconsin, was the principal speaker, and his topic was "Facing the Future." He urged a world federation based on an international constitution limiting action on national states. Nations of the world would be organized to live in harmony like the states in this country, and the constitution would provide for the four freedoms and for distribution of natural resources.

At the annual banquet held Thursday night with George K. Dreher, Ampco Metal Inc., and chairman of the Wisconsin Chapter, presiding, Maj. Gen. Stephen O. Fuqua, retired, was the principal speaker. C. E. Westover, executive vice president of the A.F.A., spoke on the objectives of the association. General Fuqua discussed a "Survey of the Battle Fronts," and pointed out that the reverses in Tunisia are only local actions, and tank columns of the enemy have no great strategic force. Rapid advance of the Germans is not too serious since any line can be broken by concentrating heavy forces at a single point. The question is whether the break can be followed up and full advantage taken of the chance presented.

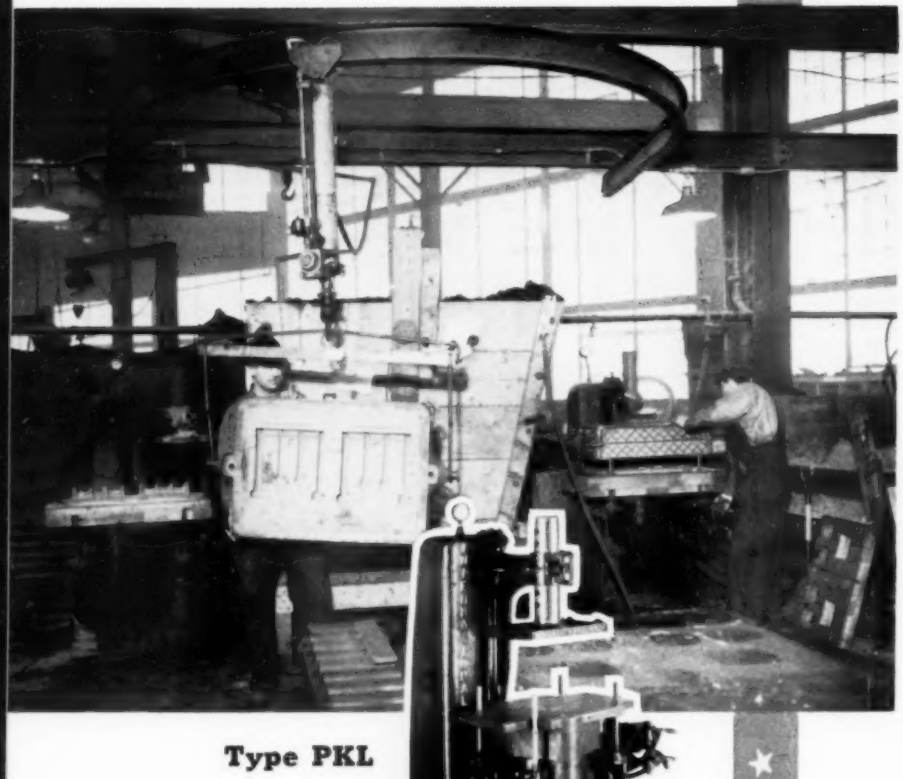
General Fuqua believes that the United Nations hold a four or five to one edge in power in Africa. He also considers that we have a greater fleet in the Pacific than the Japanese, but that the nearby bases of the enemy serve to level the striking force of the two fleets. Possible fronts that may be opened within the next few months are Australia, Siberia and India.

At a luncheon held on Friday noon under the direction of Chairman William Hambley, a number of representatives from governmental bureaus spoke briefly. Those included E. Halverson, Wage and Hour Division, National War Labor Board, Chicago; F. W. LaCroix, Scrap Salvage Division, War Production Board, Milwaukee, and Harry Werner, Information and Trade Relations Section, Found-

(*Continued on page* 172)

Type LP

All Foundry Views courtesy Wehr



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INTERNATIONA
MOLDING MACHINE

producing castings for Guns and Tanks

CASTINGS are the *first par* required in building many the Government's vital w implements. Delays i deliveries have a disastro effect on the progress of t War Program. The mainte ance of shipping schedul can be assured by using

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900 Different Sizes 70 Standard Typ
Special Designs developed to me unusual requirements.

ourtesy Wehr Steel Company, Milwaukee, Wisc.

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NTERNATIONAL
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ype LP Power Pin Lift Machine

ype PK Jolt, Squeeze, Power Pin Lift Machine
Heavy Duty Design

ype PKL Jolt, Squeeze, Power Pin Lift Machine

ype A Power Turnover, Power Draw Machine

NTERNATIONAL
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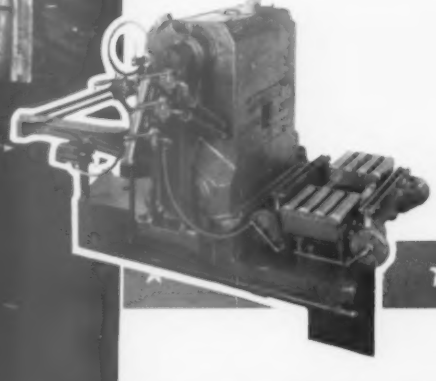
08 - 2024 West Sixteenth Street
CHICAGO, ILLINOIS

Type A



(*Continued from page* 169)

ry Division, Office of Price Administration, Chicago.

First session on gray iron was held Thursday afternoon, under the direction of Chairmen Frank Waldenmeyer, A. J. Lindemann & Hoverson Co., Milwaukee, and William Brooks, Allis-Chalmers Mfg. Co., Milwaukee. C. E. Bales, Ironton Firebrick Co., Ironton, O., spoke on "Conservation of Refractories by Proper Use," and stated that efficient cupola operation requires the right type of lining which must be installed properly. Cupola blocks should be made from high grade fireclay Mr. Bales declared, and for density and hardness should be manufactured by the stiff-mud, repressed process. The speaker recommended a double thickness of 9 x 6 x 4-inch blocks up to the charging door, and a 4½-inch circle brick lining above. Blocks last longer if laid up with a thin grouting of super-quality refractory cement.

Patching the cupola must be done with care and with good materials to prevent sloughing off and bridging. Excessive blast oxidizes the iron, and iron oxide causes severe cutting of the refractory lining. Mr. Bales recommended use of fused soda ash as a supplemental cupola flux to improve combustion conditions, make a more fluid, easily removed slag, and to reduce oxidation. Placing coke on the last charge is unnecessary, wasteful of coke, and destructive to the lining. Instead of lining cupola spouts with a sand-clay mud, trough tile should be used to prevent runouts and to give cleaner iron. Mr. Bales also described use of plastic ramming refractories for desulphurizing, receiving and mixing ladles, a super-quality refractory cement for brick lined ladles, and also told about a new type siliceous ramming refractory for lining all types of ladles handling cupola iron, malleable iron and electric furnace steel. He mentioned successful use of ladle bottom tile to give dry bottoms, to prevent runouts, and that they saved as much as 50 per cent in installation cost.

J. Vincent Olle, Motor Castings Co., and Frank Waldenmeyer presided, at the second gray iron session and the speaker was T. E. Barlow, Vanadium Corp. of America, Detroit, who discussed "Inoculations—Their Use and Effect." He said that inoculation of gray iron, when handled properly, increases tensile strength and deflection, but those may be of less importance than increase of wear resistance, machinability, hardness control and other engineering properties. In addition inoculation improves uniformity or reproducibility of results by eliminating variations in chill depth, machinability, porosity and hardness, and also permits wider versatility.

Two basic types of inoculants are available; the graphitizing and carbide stabilizing. Either can be used, but since both introduce excess material, the choice depends upon the effect of the excess. Graphitizing type alloys introduce silicon or carbon so that the excess tends to reduce hardness, strength and density. Carbide stabilizing type alloys introduce elements such as chromium so that the excess tends to increase hardness, strength, and density. Graphitizing base alloys are most effective in the harder base irons, but carbide stabilizing type is effective in all gray irons.

Most common graphitizing inoculating alloys are ferrosilicon, calcium-silicon, silicon-manganese, silicon-titanium, silicon-titanium-calcium, silicon-manganese-zirconium, silicon carbide, and graphite. Stabilizing inoculants are usually chromium-silicon-manganese base alloys with other elements such as calcium or zirconium used as boosters. Inoculation alloys do not interfere with the normal effect of such alloys as nickel, copper, chromium, molybdenum, vanadium, etc. In fact they permit alloy economy by providing the best possible base iron for alloying. Large percentages of alloys may be wasted when added to modified irons, but inoculation changes the structure to one wherein the alloys may function efficiently. Inoculating alloys should not be mixed promiscuously since they may interfere with each other. Such alloys are not cure-alls, but used wisely they form a valuable tool in the foundry.

Frank Kulka, Motor Castings Co., presided at the third gray iron session. Speaker was H. H. Judson, Goulds Pumps, Seneca Falls, N. Y., who described some of the practices employed in his plant in gating, and in cupola operation. Mr. Judson said that experiment led to the elimination of risers in heavy castings with sections 2½ inches and over, and weighing over 1000 pounds. Molds are made of open sand, molds dried, and deep copes are employed. Each job is gated on its own merits. In a pipe with a flange the

(*Continued on page* 174)

Photographs reproduced on this and following pages were taken during the Wisconsin Chapter's recent foundry conference, and were supplied through the courtesy of John Bing, A. P. Green Fire Brick Co., Milwaukee

ROSS

CORE AND HEAT TREATING OVENS FOR ALUMINUM AND MAGNESIUM FOUNDRIES

SOME ROSS CORE AND HEAT TREAT OVEN INSTALLATIONS

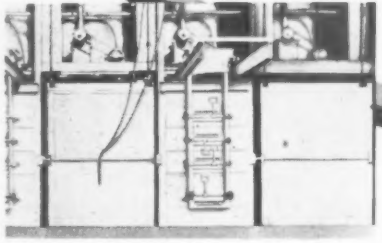
Aluminum Company of America
Bohn Aluminum & Brass Co.
Chevrolet Motor Co.
Chrysler Corporation
National Bronze & Aluminum Foundry Co.
Reynolds Metals Company
Sperry Gyroscope Company, Inc.
Westinghouse Electric and Manufacturing Company
Wright Aeronautical Corporation
and many others

For magnesium, aluminum and other non-ferrous metals, Ross Core Ovens insure, (1) uniform distribution of heat with small temperature differential, (2) increased air flow to prevent stratification, (3) controlled temperature curve (zone control when required), (4) maximum capacity, (5) minimum through metal — low heat loss. The Ross advanced method of heat control and air distribution is available in the complete line of sizes and types of Ross Core Ovens.

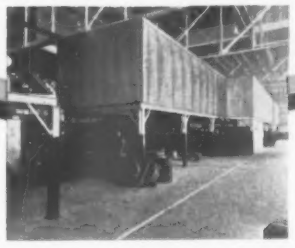
The first continuous combined heat treating and aging ovens for both aluminum and magnesium castings were designed by Ross. These Ross Ovens combine solution heat treat and aging in one process and involve only one loading and unloading operation. Other Ross Ovens are of the compartment or stationary types, heated by oil, gas or electricity.

• • •

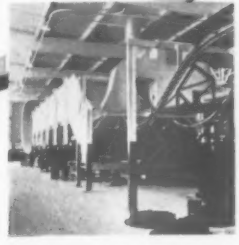
Ross Panel Construction permits quick assembly, relocating or enlarging. Consult us on your Core Baking and Heat Treating requirements. No obligation.



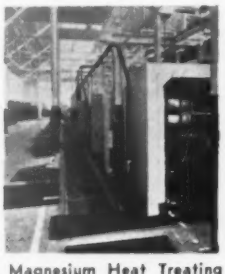
Multiple Compartment Core and Mold Oven. Middle compartment of each group has a series of drawers for small cores. On each side are doors of compartments for racks containing larger cores and molds.



Continuous Conveyor Type Core Oven in Magnesium Foundry. Batch type available for smaller production.



Continuous Conveyor Type Core Oven in Aluminum Foundry. Batch type available for smaller production.



Magnesium Heat Treating Oven for large production in airplane engine plant. Continuous automatic type.

J. O. ROSS ENGINEERING CORPORATION

Main Office — 350 MADISON AVE., New York, N. Y.

CHICAGO—201 North Wells Street

DETROIT—12953 Greeley Avenue

ROSS ENGINEERING OF CANADA, LIMITED, Dominion Square Building, Montreal

(*Continued from page* 172)

gate is into the flange, and in a cylinder with a foot, the gate is into the foot. Pressure castings never are gated along the body.

Chills are placed preferably in the cores rather than in the mold. Metal for the heavy, pressure resisting castings is melted in two cupolas and mixed to attain the desired composition. One mixture is high in steel to produce what may be a white iron as cast, and the other is a softer type of iron. For other types of castings different mixtures are melted and cast directly from the cupola. Mr. Judson stated that the harder, denser cokes give a lower carbon iron. No more coke is used with high steel mixtures than for the softer types of iron since what is desired is a low carbon iron. In a 54-inch cupola the bed is 35 inches above the tuyeres which are 5 inches above the bottom. Tapping is continuous, and a higher than normal blast is used.

Fourth session on gray iron was held Friday morning, and was devoted to heat treatment. James S. Vanick, International Nickel Co. Inc., New York, was the speaker, and George Zabel, Universal Foundry Co., Oshkosh, Wis., presided. Mr. Vanick pointed out that heat treatment of cast iron is a vast uncultivated field, and several obstructions to extensive application of such practice exist. Those include restriction to simple, symmetrical shapes; machinability; distortion; extra cost, and ability to make high strength parts as cast. Heat treatment while generally applied to strengthen or harden a casting may be used to surface soften a hard casting, surface harden a soft casting, eliminate internal casting stresses, increase machinability, etc.

Stress relief without any marked decrease in physical properties may be obtained by heating from 800 to 1050 degrees Fahr., holding for 1 hour per inch of section, and cooling slowly in the furnace. Alloy cast irons may in some instances be heated to 1200 degrees without softening. Annealing to secure increased machinability may require temperatures up to 1700 to 1800 degrees if considerable massive cementite is present. With a gray structure the temperature may be considerably lower, say 1200 to 1400 degrees Fahr. To be suitable for heat treatment gray irons should possess a finely distributed flake graphite structure and a full complement of carbon in solution. Procedure is to heat to 1450 to 1550 degrees, hold, and quench in oil. After quenching the castings are tempered or drawn at some temperature above 300 degrees Fahr.

Cool in Still Air

Complicated or irregular shaped castings which cannot be liquid quenched may be treated to extinguish differences in cooling rates of the sections by heating to 1450 to 1550 degrees, holding until all parts reach that temperature range, and then cooling in still air. Hot quenching or isothermal treatment to secure greater toughness and wear resistance is accomplished by heating to 1400 to 1600 degrees Fahr. and quenching in a hot liquid held at some predetermined temperature such as 400, 600 or 800 degrees Fahr. Other types of heat treating include nitriding, flame hardening and induction hardening.

At the final session on gray iron held Friday afternoon, A. Haack, Wisconsin Gray Iron Casting Co., presided, and Earl E. Woodliff, Foundry Sand Service Engineering Co., Detroit, spoke on "Applied Sand Control." According to Mr. Woodliff applied sand control means applying the little comparatively scientific information available on sand and molding materials in a practical way to control the various properties of molding and core mixtures. He pointed out that binders in sand mixtures may provide green or working strength, dry or baked strength, or high temperature stability or combinations of those. Showing a table of the commonly used core materials, Mr. Woodliff indicated their effect on such properties as smoothness, permeability, green strength, baked strength, and collapsibility. From the table it is possible to select a group of materials to function as desired in a core mixture.

In a joint session of all groups held Friday afternoon Harry W. Dietert, Harry W. Dietert Co., Detroit, showed an interesting colored motion picture depicting the behavior of molding sands and cores at elevated temperatures. Various casting defects were shown, and those were followed immediately by views of how the sand behaves at pouring temperatures. Then the film pictured ways and means of correcting the sand followed by showing the reactions of the improved sand under high temperature conditions.

Sessions of the malleable section were occupied largely by discussions of problems related to war work and influence of the war on current and future demand for the industry's products. Use of malleable castings in making war equipment parts has increased steadily in recent months, and the industry has a good opportunity to prove its product to the armed services, it was pointed out by Milwaukee district representatives of the Army and Navy who participated in one symposium.

This session, presided over by L. D. Harkrider, General Malleable Corp., Waukesha, Wis., included among its speakers Commander D. M. Curry, of the Naval Inspector's office; R. W. Gross and F. Loveland of Army Ordnance; J. C. Mc-

(*Continued on page* 177)

RED-X 8

● Long before the War, we developed and patented a series of Aluminum Alloys known as **Red-X.** One of them in particular,—**Red-X 8**—has been found extremely useful in War work.

Some of our customers, faced with the problem of finding a satisfactory Aluminum Alloy to replace Virgin 355, decided to try **Red-X 8.** They obtained such satisfactory results in so many different applications, that we feel justified in recommending **Red-X 8** for use where high physical properties and easy pouring characteristics are required.

Here are chemical and physical properties of **Red-X 8.**

	Min.	Max.
Cu	1.0%	2.0%
Fe	...	1.0
Mg	0.2	0.5
Mn	0.2	0.6
Si	7.0	8.5
Zn	...	1.0
Al	88.0	—

Rockwell E. Hardness	90
Elongation %	3.1
Proportional Limit	18500 lbs/in²
Yield Strength	28900 lbs/in²
Tensile Strength	41600 lbs/in²

Physical properties are average obtained from 20 permanent mold test bars given a T 6 heat treatment.

Silicon content may be varied, cutside these limits, to meet customer's demands for an alloy with different foundry properties.

Particular attention is called to the figures on proportional limit and yield strength. These unusual properties are characteristic of **Red-X 8** Alloy.

Further information will be gladly furnished on request.

THE NATIONAL SMELTING COMPANY

6701 Grant Avenue - Cleveland, Ohio

—working as a team, they *pack a wallop!*

NEW ALLOYS FOR THE IRON AND STEEL FOUNDRY

Molybdenum is one of the foundryman's approved alloying agents. FERRO-BORON can now be added to advantage.

Boron in cast iron contributes to hardness, impact value, and fineness of grain. Special usefulness in wear-resisting compositions has been demonstrated. The beneficial effects of Boron in cast steels also is worthy of interest.

The most economical and convenient form in which Boron can be introduced is a new FERRO-BORON developed by the Molybdenum Corporation. Leading foundries have adopted it with marked success. Inquiries will be welcomed.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.

MOLYBDENUM

CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

(*Continued from page* 174)

Ilhone, General Malleable Corp.; Frank Harris, Belle City Malleable Iron Co., Racine, Wis., and Joseph Kropka, Chain Belt Co.

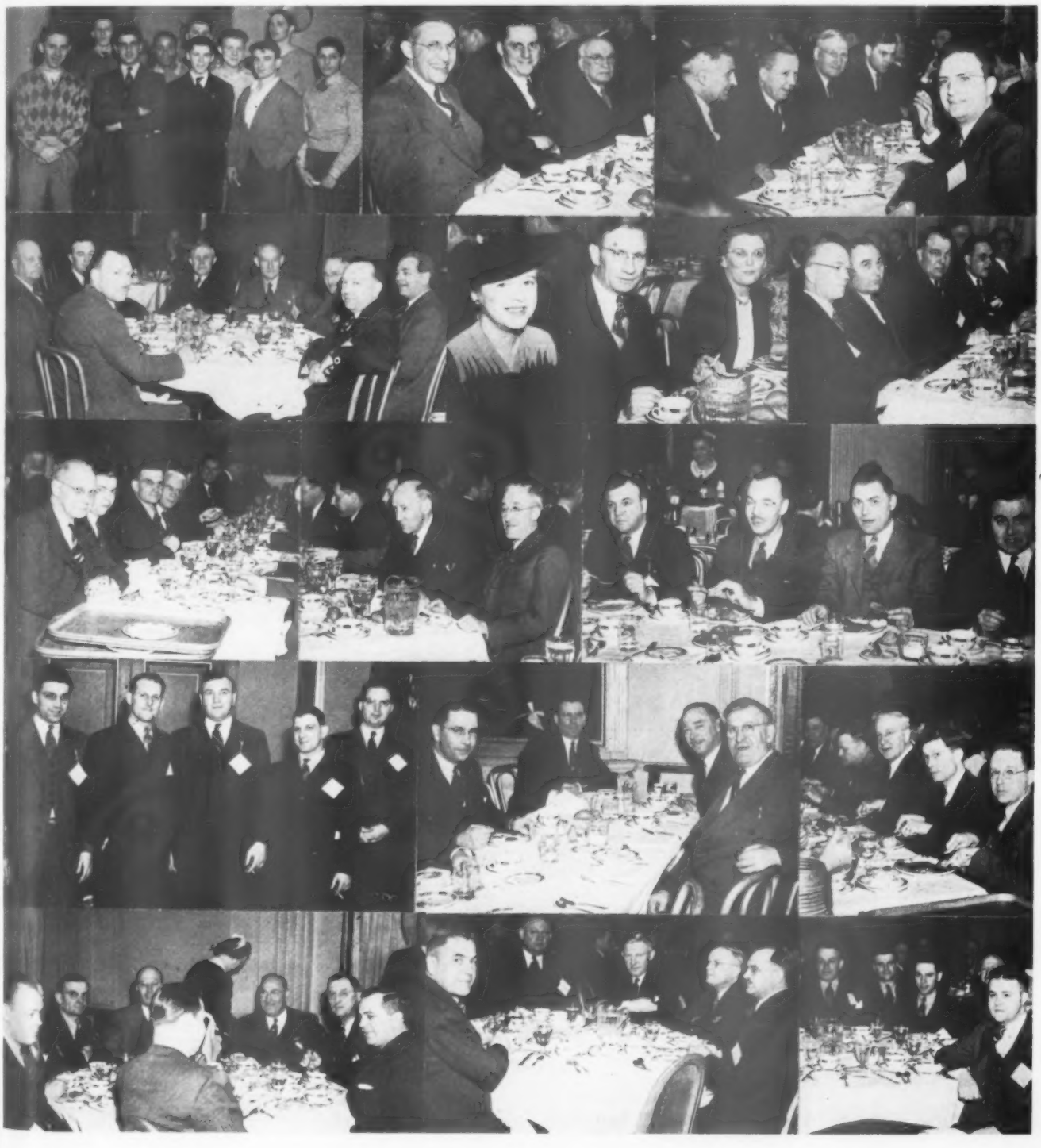
Maileable iron use has been authorized recently for additional important naval parts, including certain gun mounts, it was disclosed. This conversion has effected savings in consumption of bronze as well as rolled and cast steel. Commander Curry urged foundrymen to be familiar with the navy specifications covering the castings they are furnishing and suggested that copies be made available to all personnel supervising such production. He also recommended that copies of all correspondence relating to work on navy parts be furnished the naval inspector's office in order to facilitate the latter's dealings with the foundry.

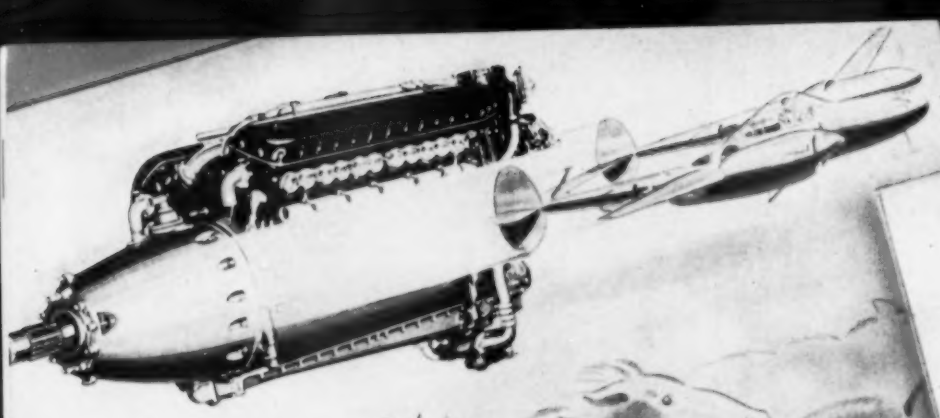
Both the Army and Navy primarily are interested in the quality of the products they buy, it was emphasized, but this does not require rejection of castings because of superficial surface defects. However, no welding or plugging of imperfections is permitted. In this connection, one foundryman stated his company made a practice of saving castings rejected by an inspector because of surface defects, since machining frequently disclosed sound castings which subsequently were approved.

Government inspectors also are concerned with production methods, since adequate control over operational procedure will be a determining factor in quality of castings. For instance, annealing temperature chart recordings should be readily available to inspectors, it was pointed out.

Three sets of specifications cover malleable iron castings for Army requirements —A-X-S623, QQ-I-666 and TDA-No. 101. The first named applies only to pearlitic malleable.

(*Concluded on page* 215)





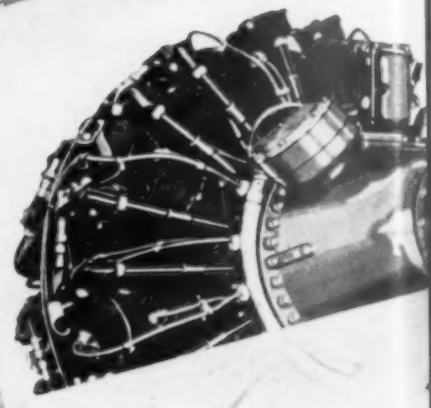
OSBORN HARNESSES HORSES
IN *Allison's* POWERHOUSE

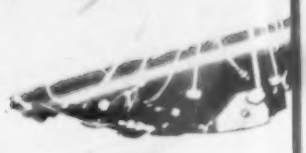
DRIVING that incredible combination of speed, fire-power, high altitude and long range known officially as the P-38, are a pair of sleek, liquid-cooled Allison engines. Between them these power plants can turn up well over 2000 horsepower, and maintain that output for hours at a time.

Combining such power, holding and directing it so it can be transformed into useful work is one of the jobs of the Allison's many precision-moulded aluminum and magnesium castings. It is a matter of pride and of sober responsibility to Osborn that virtually every major casting in the Allison engine is moulded on Osborn moulding machines.

Precision and Production—Volume production of moulds for Allison cylinder heads, blocks and numerous other vital parts is achieved with the Osborn No. 105-79 moulding machine described on the following page.

THE OSBORN MANUFACTURING COMPANY
Cleveland, Ohio





OSBORN
BARBS TH
Wasp
18 STING

It's a big job you're doing, *Foundrymen*

THE fighting Pratt & Whitney DOUBLE WASP packs its tremendous power in two banks of 18 cylinders, each of which is serrated with dozens of cooling fins cast integrally with the aluminum cylinder head.

Since power output depends in large part upon the cooling efficiency of these fins they are made deep and thin, so they can be closely spaced (about 5 to the inch) and give maximum cooling surface.

The successful moulding of such precisely designed parts demands the highest type of precision in a moulding machine, for the slightest variation in drawing the pattern will distort or damage the thin walls of sand between the fins. But the need for mass [illegible] these powerful engines means this delicate [illegible] must be performed with precision and [illegible]

Precision and Production—that's [illegible] factors responsible for today's [illegible] accurate cylinder heads for Pratt [illegible] Shown on the next page is the [illegible] of the high-quality, high perform[illegible] on which those cylinder heads [illegible]

THE OSBORN MANUF[illegible]
[illegible] Hamilton Avenue

ORN MOULDS MUSCLES
R America's WOLF-KILLERS

IN ever-growing numbers the Navy's fast, formidable [illegible] boats—"Sub-Sluggers" to sailors—are [illegible] track down and destroy the Nazi [illegible] merchant shipping. From [illegible] and locations [illegible]

PRODUCING the tremendous quantities of precision-cast parts needed by an Arsenal of Democracy is a tremendous job. It calls for great effort, great ingenuity, and no little sacrifice.

From its foundrymen, America is receiving these things in full measure.

But the war job also demands the fastest, most efficient production methods ever contrived . . . and at the same time, a degree of accuracy in castings almost without precedent.

These things too, America is getting from its foundrymen.

For many of your most exacting production problems you foundrymen have chosen Osborn Moulding Machines. That fact is our obligation for increasing development and improvement in the service and performance of every Osborn machine.

It's an obligation which we are working day and night to fulfill.

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue *Cleveland, Ohio*

OSBORN

MOULDING MACHINES

Conveyor Trough

Link-Belt Co., 2410 West Eighteenth Street, Chicago, has developed a screw conveyor trough, a combination of steel trough bottom, wood sides and wood cover, lag screwed together to form a complete, tight enclosure for the screw and the conveyed material. It is claimed a substantial percentage of steel is saved by this form of construction as compared

with the former all-steel trough and cover. The new type trough is adapted to all standard screw conveyor fittings; will readily connect with existing steel trough and can be shipped with sides and bottom assembled. The curved bottom, no heavier than No. 10 gage, has the added advantage of being removable by unscrewing the lag screws securing it to the wood sides. This feature facilitates cleaning and replacement.

Bottom Board

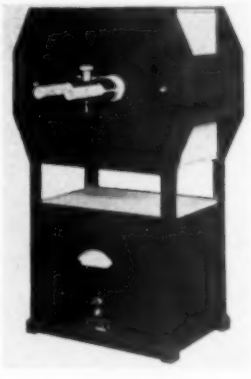
Johns-Manville Corp., 22 East 40th Street, New York, has developed an entirely new type bottom board for use in foundries. The new board is made of asbestos with highly heat resisting bonding agents. It is claimed the boards are strong and durable, light in weight, readily machinable and easily cleaned. Other advantages include ability to withstand suddenly applied heat, high resistance to warping and charring and a uniform foundation for the mold from the time it is made until it is shaken out. Another advantage under present conditions is that the boards are made from noncritical materials.

Refractory Bond

Ironton Fire Brick Co., Ironton, O., has developed a special purpose, super quality, refractory bonding mortar for use with brick work exposed to high temperatures. It is claimed that this cement prolongs the life of the lining in cupolas, ladles, malleable furnaces and in electric furnaces where high alumina or super duty fire clay brick are used in the roof and walls. The material, a dry powder, is supplied in 100-pound multiwall paper bags. May be used as a dip or for troweled joints. After the bricks or blocks are tapped into place a brush coat of the creamy cement is applied to the face to fill in all crevices and make the lining highly resistant to slag erosion, spalling and metal penetration.

Laboratory Furnace

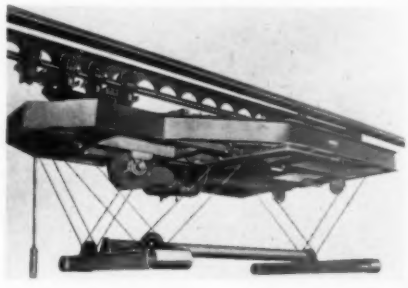
Harry W. Dietert Co., 9330A, Roselawn Avenue, Detroit, announces a new high temperature laboratory combustion furnace for use in rapid determination of carbon and sulphur in ferrous and nonferrous metals. Outstanding feature of this furnace shown in the accompanying illustration is the short overall length without sacrifice of efficiency in the combustion zone. Globar heating elements are at right angles to the combustion tube. Exposed ends of the heating elements and electrical connections do not take up space along the axis of the com-



bustion tube. The small combustion tube speeds the sulphur and carbon determinations because of the smaller volume of gas handled. Heat is confined to the section of the tube where it is required for rapid combustion of the sample. Both ends of the combustion tube are fully exposed to the room atmosphere. This insures efficient cooling of the tube ends and prevents oxidation of rubber connections. Electrical accessories are securely housed in the lower compartment. A shelf on top of the compartment is for the operator's tools. The furnace weighs 195 pounds, is 31 inches high, 19 inches wide, 10 inches furnace length and 15 inches overall length. Electrical input, 230 or 115 volts, single phase; 2 KVA, maximum power consumption.

Tramrail Carrier

Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., announces a new stabilized tramrail carrier, a simple patented arrangement



of ropes to form a triangular suspension which holds a load rigidly in place and eliminates longitudinal, lateral and rotational sway. The rope angles bear a definite relationship to one another and have been worked out according to a mathematical formula. Even where the load is considerably unbalanced it is claimed the carrier will hold it rigidly in place. Another desirable advantage permits tilting of the load in either direction with relation to the rail. Where necessary the load may be rotated by a trunnion type load bar. The stabilized carrier may be operated on two standard Cleveland Tramrails or on a double girder bridge. It also may be operated on the regular type overhead Cleveland Tramrail rail on each side of which are provided parallel flat rails or I-beams for the support of stabilizing rollers. Carriers have been built with capacities of 1, 3 and 5 tons. Some are hand propelled and others electrically, but all are provided with motor-driven hoist. They may be built for various capacities and speeds to suit individual requirements.

Motor Record Card

General Electric Co., Schenectady, N. Y., has a motor record card available for free distribution, particularly for maintenance engineers. The card, 4 x 6 inches, is a convenient size for card files and contains space on both sides for recording essential information on each motor, also the nature and extent of inspection and repairs. With a card for each motor the maintenance engineer has the motor's history at hand for ready reference. Excessive attention or expense will show up and the causes can be determined and corrected.

Cash in on these

5

DIFFERENT

BONDING

CLAYS

No one bonding clay can possibly do all jobs equally well. Take advantage of ECP's FIVE different types of bond clays, which, with many resulting combinations, enable you to get the very best results:

DIXIE BOND is the strongest bonding clay in America. It has the highest green strength and the highest flowability, together with moderate dry strength.

BLACK HILLS BENTONITE has higher dry strength and higher resilience than any other type, with high permeability, high green strength and high dry strength.

REVIVO BOND is highly refractory and very economical due to its low initial cost and great durability.

BALANCED REVIVO has extremely high dry and hot strength, with moderately high green strength.

REVIVO SUPER BOND gives you high green strength and very high flowability.

ECP's 18-year background in the producing of bonding clays is yours to command with a view to helping you choose and use the *one right clay* for your purpose.

EASTERN CLAY PRODUCTS, INC.

EIFORT, OHIO

ECP

DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO

5 TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

Respirator Filter

American Optical Co., Southbridge, Mass., announces a new air-filtering cartridge designed to be used with its respirator for protecting lungs against all kind of dust. The respirator facepiece contains a compartment into which a cartridge can be inserted. Seven types of cartridges now are available for interchangeable protection against respiratory hazards faced by workers, including fumes, gases and mists.

Gloves

Industrial Gloves Co., Danville, Ill., has adapted one of its many steel reinforced gauntlets for the use of women engaged in handling rough, jagged or sharp materials in industry. Designed on a small comfortably fitting pattern the gauntlet is made of sturdy chrome tanned

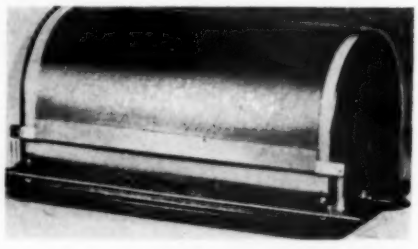
leather, reinforced on all wearing surfaces with steel ribbons, placed diagonally for protection against cuts and snags. All seams are sewed closed with steel thread. The thumb wearing surface and the junction of palm and thumb are reinforced with extra leather and steel ribbons for added protection and wear. May be had with 2-inch band instead of gauntlet if desired.

Metal Sprayer

Alloy-Sprayer Co., 2040 Book Building, Detroit, is distributing a portable alloy sprayer for spraying wood core boxes and patterns with a light coating of metal to a thickness between 0.002 and 0.005-inch. If necessary a thicker coating can be applied to worn areas. Equipment includes an electrically heated and thermostatically controlled melting pot properly insulated in a compact housing with a gun handle for air pressure control. The low fusing alloy in bar form is placed in the pot and the electrical connecting cord plugged into either alternating or direct current voltage circuit. Spraying is accomplished by compressed air by pressing the trigger on the gun handle. Fineness of spray is adjusted by a small control button on the outside of the gun. The metal specially developed for the purpose fuses at a low temperature, but has a relatively hard surface when finished.

Photocopy Machine

American Photocopy Equipment Co., 2849 North Clark Street, Chicago, has developed a machine which produces exact copies in sizes up to 18 x 22 inches



of anything typed, written, printed, drawn, blue printed, or photographed, without a dark room and without skilled or technical knowledge. There is no maintenance cost and the operating cost depends on the size of the copy. With one of these machines it is claimed one person can do the work ordinarily performed by a dozen. The machine also releases typewriters, drafting and other equipment.

Hard Surfacing

Eutectic Welding Alloys Co., 40 Worth Street, New York, has placed on the market two types of hard surfacing materials for rebuilding worn parts and equipment at low welding temperature to provide high wear resistance. The material is a ferrous base containing various alloys. One type is designed for gas welding, and gives a brinell hardness of 450 to 500. The other type for alternating or direct current welding gives a brinell hardness of 575 to 675.

Tool Grinder

Standard Electrical Tool Co., 2488 River Road, Cincinnati, has redesigned its 3-horsepower carbide tool grinder. The machine illustrated has a 3-horsepower motor running at 1150 revolutions per minute, operated by magnetic reversing starter and separate three push button station. Spindle ends are equipped with heavy steel backing plate for the mechanically mounted cup type grinding

wheels. The rigidly mounted work table at each side is graduated to permit a 5 degree adjustment toward the wheel and 30 degree angle away from the wheel. Each wheel is guarded by special construction with an adjustable shoe "A" or splash guard, adjusted by a convenient hand screw "B." The machine may be used either for wet or dry grinding. The wet grinding attachment is powered by individual motor drive and controlled by separate toggle switch. The machine also is available in 1 and 2-horsepower sizes for 10 and 12-inch wheels respectively.

Low Headroom Hoists

Northern Engineering Works, 2615 Atwater Street, Detroit, announces a line of low headroom hoists in capacities from 1 ton up, for operation on the various types of special section monorail track system. The line includes cab and

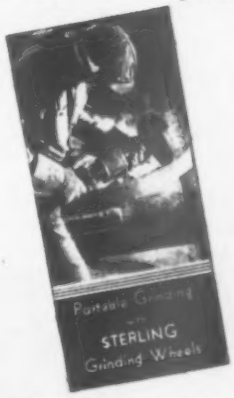
floor controlled models with or without a new variable speed push button control. Gearing is machine cut, heat treated to eliminate wear. Heavy duty roller bearings and splash lubrication assures low friction load and freedom from wear. The mechanical load brake can be reached and friction surfaces replaced without removing the hoist gear case cover. Split gear case provides easy access to gearing and bearings.

Dynamometer

W. C. Dillon & Co. Inc., 5410 West Harrison street, Chicago, announces a new model dynamometer adapted to weighing crane loads or for use wherever it is necessary to measure tension or applied stress. It may be easily attached to a crane or hoist hook for weighing purposes. The instrument's maximum hand remains at peak load for check-back, and main indicator hand resets itself instantly when load is released. Galvanized shackles are tested to 25,000 pounds, and overload is said not to injure the mechanism. Furnished in eight different capacities up to 15,000 pounds, the device measures 3 x 6¼ x 8¼ inches and weighs 8 pounds 4 ounces.

BOTH are soldiers dedicated to victory in the shortest time possible - the man on the battlefront and the worker in the foundry! Each has his job to do - on time!

No need to worry about the soldier; he will do his job IF he has the materials to do it with! Delivery of those materials depends upon speedy output of the castings to be used in the tanks, guns, planes, ships!



Send today on your letterhead for the new folder, "Portable Grinding With Sterling Grinding Wheels".

Doing your casting cleaning in the quickest time possible is a big step toward victory. Sterling Grinding Wheels, built to the special demands of your snagging job, are important aids in turning out record-breaking amounts of war materials.

May we help you achieve new production records by stepping up production in your casting cleaning rooms?

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

Quad-City

REGULAR monthly meeting of the Quad-City Chapter of the A. F. A. was held at the LeClaire Hotel, Moline, Ill., Feb. 15, with 66 members in attendance. Chairman Alex Matheson, French & Hecht Inc., Davenport, Iowa, presided. Secretary of the American Foundrymen's Association, Robert E. Kennedy gave a brief resume of chapter activities throughout the country and said that a great deal was being accomplished through the free and cordial exchange of ideas. He also urged members to attend the war conference scheduled for St. Louis, April 28 through 30.

Topic for the evening was "Aluminum and Light Alloys". Twenty students of the National Aircraft School, Rock Island, Ill., were present to hear the discussion. Speaker was Howard J. Rowe, general technical department, Aluminum Co. of America, Cleveland. He showed an interesting technicolor picture entitled, "Unfinished Rainbows" which outlined the history of aluminum up to the present time. Mr. Rowe discussed melting, pouring and gating of aluminum castings. He outlined various modern practices in use to overcome gas absorption and dross formation. Also covered were postwar possibilities for light alloys. The speaker believed that there would be large tonnages of secondary aluminum on the market after the end of the war.—*H. L. Creps, recording secretary.*

New Jersey

ALTHOUGH a departure from the usual technical discussions, the program of the New Jersey Foundrymen's Association's dinner meeting, at the Downtown Club, Newark, N. J., Feb. 24, attracted more than 100 members and guests.

Dr. Michael M. Dorizas, professor of geography, Wharton School of Finance and Commerce, University of Pennsylvania, was the guest speaker, his topic being "The Present World Scene." Dr. Dorizas gave an analysis of the present war situation in terms of economic, manpower, racial and other factors. He also stressed the relation of developments that have occurred on the various widely separated battle fronts.

Following his talk, he presented motion pictures of recent action in North Africa and in Russia, together with earlier films of the attacks on Pearl Harbor and on Singapore, and actions in Midway, the Coral Sea and Solomon Islands.

A. E. Winsted, Moore Bros. Co., Elizabeth, N. J., presided as president.—*Arthur M. Torrey, acting secretary.*

Birmingham

FIRST meeting of the new year for the Birmingham District Chapter of the A. F. A. was held Friday, Jan. 15, at the Tutwiler Hotel, Birmingham. After dinner the group's annual quiz program was held. The following experts endeavored to answer all questions asked them from the floor: Metallurgy, Dr. James T. MacKenzie, American Cast Iron Pipe Co.; melting, C. S. Whittet, National Cast Iron Pipe Co.; cores and sand, Lloyd Stone, Stockham Pipe Fittings Co.; gates and risers, Tom Bellsnyder, Jefferson Foundry Co.; coke, W. M. Mobley, Alabama By-Products Corp.; nonferrous castings, Charles Wegelin, Dixie Bronze Co. Quiz director was Jim Bowers, American Cast Iron Pipe Co. — *Howard A. Nelson, secretary-treasurer.*

Northern California

REGULAR meeting of the Northern California Chapter of the A.F.A. was held Friday, Feb. 12 at the Athens Club, Oakland, Calif., with a total attendance of 112. F. A. Mainzer, chapter chairman, presided, and the speaker was introduced by Serge P. Kovaleff, program chairman. Charles B. Schureman, F. E. Schundler Co., Joliet, Ill., who is a technical consultant on foundry sands and molding practices, discussed, "Synthetic Sand, Its Properties and Utilization."

The presentation was made in part by use of a blackboard which added interest and held everyone's close attention. The question and answer period carried the meeting beyond the usual adjournment time of 10 o'clock.

Special meeting for the nonferrous foundrymen of the Northern California Chapter of the A.F.A. was held Feb. 26, at the Engineers Club, San Francisco. The speakers were local men who are devoting all their energies to getting more and better results from their efforts to produce castings for the armed forces. George W. Stewart, superintendent, Pacific Brass Foundry of San Francisco, detailed some of the problems he had worked out to meet exacting demands for castings of a type and size new to the plant. He paid tribute to the workers and emphasized that a loyal working force is the greatest asset.

The second speaker, D. T. Berman, manager, San Francisco Brass Die Casting Co., stated he was not a foundryman, knew few of their terms, but as for problems, he had plenty of his own. He gave a short historical sketch of the die casting business and of the several methods used. A number of sample castings were made available for examination.

Concluding the program, two reels were shown of the Beardsley & Piper sandslinger. Chapter Chairman Fred A. Mainzer presided.—*George L. Kennard, secretary-treasurer.*

Western New York

SIXTY-FIVE members and guests were present at the March 5 meeting of the Western New York Chapter of the A.F.A., held at Hotel Touraine, Buffalo. R. T. Rycroft, chairman of the chapter, presided. Henry Winte, metallurgist, Worthington Pump & Machinery Corp., acted as technical chairman and introduced the principal speaker of the evening, Thomas Barlow, Vanadium Corp. of America, Detroit, whose subject was "Alloy Inoculations."

With the aid of slides and charts, Mr. Barlow presented many interesting ideas on modified irons. An educational discussion period followed presentation of the paper.

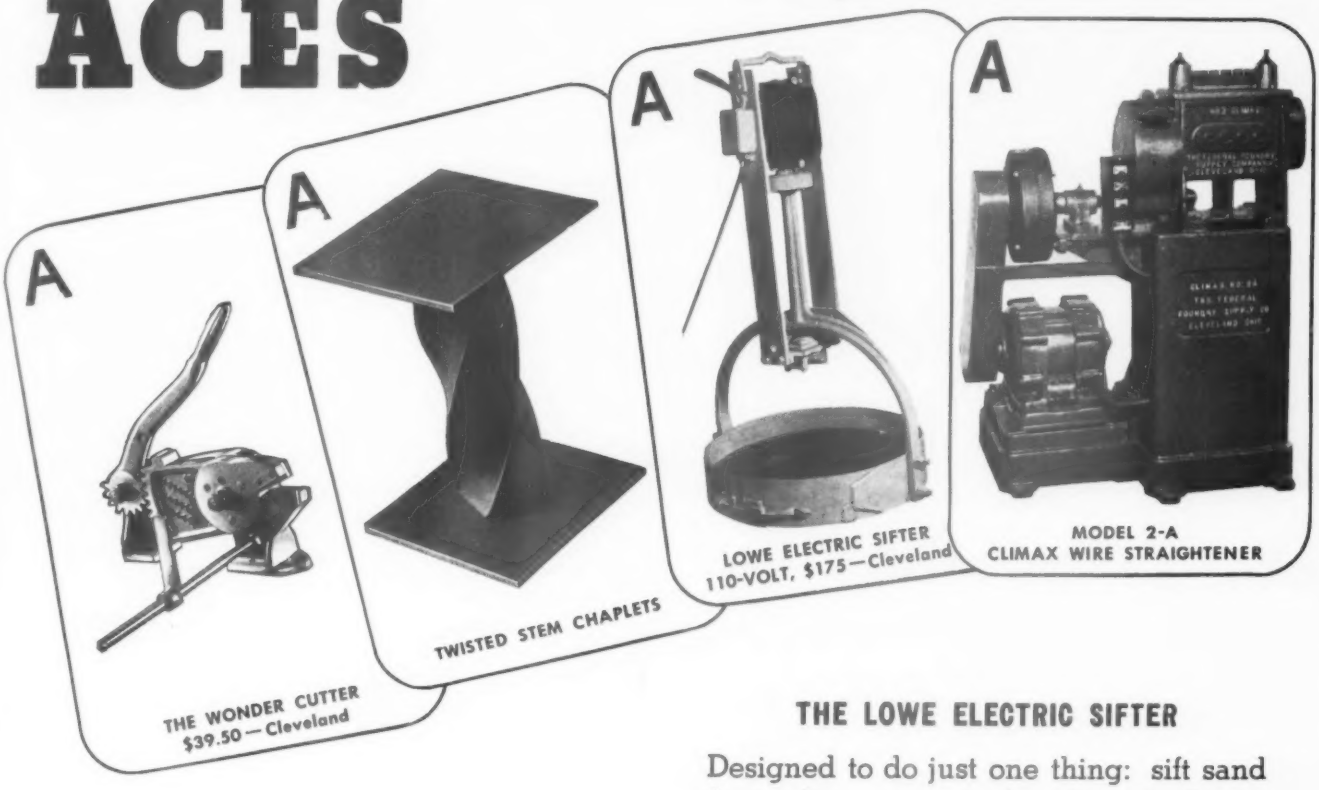
The April 2 meeting of the chapter, to be held at Hotel Touraine, will cover nonferrous foundry problems.—*J. R. Wark, secretary.*

Detroit

NEARLY 130 were in attendance at the Feb. 18 meeting of the Detroit Chapter at the Rackham Memorial, taxing service facilities because many did not make advance reservations. A score or more came in after the dinner to attend one of the four roundtable discussions which were held on the subjects of cleaning room practice in steel foundries, problems in the use of malleable castings

(*Continued on page 186*)

FOUR ACES *in any hand!*



THE WONDER ROD AND BAND CUTTER

Cuts core rods, gagger stock or band iron easily, quickly and economically—right where they're needed. The Wonder Cutter is small—can be placed on any bench; inexpensive—you can own several.

FEDERAL TWISTED STEM CHAPLETS

The chaplet designed for perfect fusion. Four sharp fusion edges the entire length of the stem. Uniform stem thickness eliminates premature burning-in. All standard sizes—round or square heads—sold at the same prices as ordinary chaplets. Samples gladly submitted.

THE LOWE ELECTRIC SIFTER

Designed to do just one thing: sift sand faster than you can shovel it in! Faster sifting means better sand—better sand results in cleaner castings. The Lowe Sifter is economical of power, can be operated from any light socket. Deliveries are excellent.

THE CLIMAX WIRE STRAIGHTENER

350 pounds of ¼" core rods per hour! You can straighten that quantity of used rods right in your own foundry using unskilled labor and the No. 2-A Climax Wire Straightener shown above. Made in three sizes, each of which handles a variety of wire sizes. Designed for long life — easy to own — safe to operate. Our latest circular illustrates the 3 sizes and 9 models. Ask for it today.

THE FEDERAL FOUNDRY SUPPLY CO.

4600 EAST 71st STREET, CLEVELAND, OHIO

CHICAGO — CHATTANOOGA, TENN. — DETROIT — MILWAUKEE — MINNEAPOLIS — NEW YORK — RICHMOND, VA. — ST. LOUIS — UPTON, WYO.

THREE serious labor problems confront you today: (1) The manpower shortage; (2) skyrocketing labor costs; and (3) absenteeism.

The situation is particularly acute on jobs which formerly could be handled by low-priced, unskilled labor. Especially is this true of such a back-breaking job as the cutting of molding sand.

When this work is done by hand or by semi-machine methods the cost is much higher than we can guarantee by the use of SANDCUTTERS—the cost-cutting method which more than 1300 foundries have relied upon for over 25 years.

We would like to give you all the facts necessary in judging the desirability of applying the SANDCUTTER method to your foundry. There are many models and sizes from which to choose—and we can assure you that the one you select will pay for itself many times over. Scores of Sandcutters have been used for twenty years and more.

TRADE MARK
THE AMERICAN MOLDER

AMERICAN
FOUNDRY EQUIPMENT CO.
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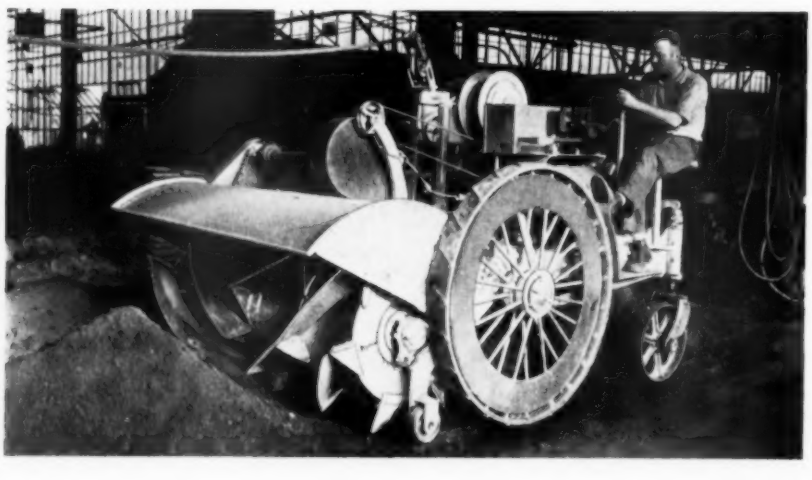


(*Continued from page* 184)

in ordnance; gating and risering magnesium castings; and aluminum foundry core practice.

The light metal discussions drew the major share of attention, particularly the presentation by H. W. Dietert, Harry W. Dietert Co., Detroit, on core practice in aluminum work. Mr. Dietert showed a particularly interesting color movie on some of the tests he has conducted in this field.

M. E. Brooks of the Dowmetal Foundry, Bay City, Mich., directed the magnesium discussion in his usual able fashion.

Major E. K. Smith of the tank engineering branch of the Tank-Automotive Center in Detroit, presented an engrossing but off-the-record discussion of malleable in ordnance.

C. E. Silver of Michigan Steel Casting Co. led the roundtable on steel foundry cleaning room practice.

A novel diversion was a brief but illuminating talk detailing events of the Dieppe raid, by a participant, Private L. Taylor of the Essex Scottish Regiment in Windsor, Ont.—*A. H. Allen, secretary.*

New England

A RECORD number of members and guests turned out to welcome L. P. Robinson, Werner G. Smith Co., Cleveland, who addressed the regular monthly meeting of the New England Foundrymen's Association held March 10 at the Engineer's Club, Boston.

Mr. Robinson, after dwelling for some length on the events which took place in the old days when he was a representative in the Boston district, spoke on core troubles with particular reference to the proper baking of cores. He said that baking is one of the most important processes in the manufacture of cores, and that it is of utmost importance to see that the little details in the process are performed carefully. It is necessary to check and clean thermocouples and pyrometers regularly and to check the accuracy of the instruments against a standard thermometer from time to time. Most cores should be baked from 400 to 425 degrees Fahr., and when the temperature is allowed to exceed the maximum figure, no benefit is derived and sometimes a defective core results.

If a core coming out of the oven smells of core oil, it is pretty good proof that the oil was not properly oxidized. Moisture in the center of such a core will not be eliminated by putting the core through the oven a second time. The extra heating will darken the core on the surface, but the moisture in the center will be prevented from escaping because of the oxidized film on the outside.

In reference to oil ratios, Mr. Robinson stressed the fact that in a large majority of cases, the real oil ratio is not known. The ratio should be checked regularly with the workman, and to in-

sure the highest degree of accuracy, it is better to weigh the oil rather than measure it. The correct sequence of adding materials when cereal binder is used, he said, is: Cereal binder, water and oil. He mentioned that considerable research had been done in that respect and that when the correct order of addition is used, greater tensile strength of the core invariably is obtained.

Mr. Robinson touched briefly on the cupola research program which now is being carried on by the A.F.A., saying that the response in many localities indicates the need and guaranteed success of this program.

After the address, many questions were asked the speaker and a lively and profitable discussion followed.

Next regular meeting of the association will be held April 14 with Donald J. Reese, chief, Iron and Steel Manufacture Section, Metallurgical and Technical Branch, WPB, Washington, as the guest speaker. He will talk on "Cupola Practice."—*Merton A. Hosmer.*

Central Indiana

APPROXIMATELY 100 members and guests were present at the March 1 meeting of the Central Indiana Chapter of the A.F.A. which was held at the Washington Hotel, Indianapolis. Ralph A. Thompson, Electric Steel Castings Co., Indianapolis, and secretary of the chapter, presided; Howard J. Rowe, metallurgical engineer, foundry division, Aluminum Co. of America, Cleveland, spoke on "Aluminum Alloy Castings".

The subject was of interest to many members of the chapter and as a result attracted numerous producers of aluminum castings. A special guest at the meeting was Frank G. Steinebach, editor of THE FOUNDRY.

Speaker at the April 5 meeting of the chapter, to be held at the Washington Hotel, Indianapolis, will be Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va. His topic will be, "Today's Cupola Operation and Scrap."—*Ralph A. Thompson, secretary.*

Metropolitan

X-RAY and Gamma ray inspection were topics of discussion at the March meeting of the Metropolitan Chapter of the A.F.A. held at the Essex House, Newark, N. J., Monday, March 1. The speakers were A. Gobus, Lucius Pitkin Inc., New York, who spoke on gamma ray or radium radiography, and H. Isenberger, St. John X-ray Laboratory, Long Island City, N. Y., who spoke on X-ray radiography.

Mr. Gobus pointed out the advantages of radium inspection were the ease of transportation of the radium capsule, the ability to radiograph sections of considerable variation in thicknesses and the advantages of inserting a small capsule in a cylindrical object and radiographing

Unretouched photos, aluminum castings: without "Foseco" De-Gaser (left) and with "Foseco" De-Gaser (right).

WHICH *looks like* YOURS?

ELIMINATE POROSITY . . .
IMPROVE PHYSICAL PROPERTIES

with FOSECO Aluminum De-Gaser

You *can't* make sound aluminum castings, billets, slabs, etc., free of porosity, if gases and oxides remain in the melt.

But you *must* make sound, high-physical-property castings, to meet the high specifications required for aircraft, to stand X-ray inspection, to speed modern production.

Problem? *The answer is simple:* "Foseco" De-Gaser!

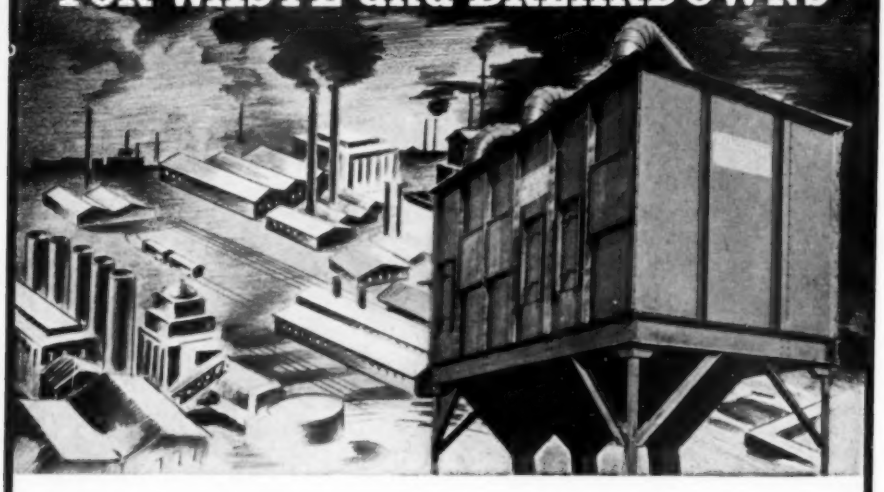
"Foseco" Degasing evolves inert gases in the liquid metal, eliminates pinhole porosity, increases physical properties, especially elongation. And it's so simple to use, any unskilled person can quickly learn its application. For example, it eliminates the safety precautions required with chlorine, eliminates transportation and storage of cylinders, piping, control instruments.

Try it! Try a sample order. And draw your own pictures! For detailed information, write

FOUNDRY SERVICES, INC.
280 Madison Ave., New York, N.Y.

There's NO TIME!

FOR WASTE and BREAKDOWNS



Pangborn Dust Control will STOP costly sabotage

There is no excuse today for waste or breakdowns caused by the destructive wear and tear of DUST.

Modern dust control, as successfully installed by Pangborn engineers, safely and economically rids your plant of the dangers of dust.

Dust is trapped at its very source. It is exhausted into collectors, where it is held for disposal if worthless—or salvaged if it has "raw product" commercial value.

If you wish to conserve valuable time—and provide better sanitary working conditions in your plant—"come to Pangborn" with your large or small dust problems.

PANGBORN

The World's Largest Manufacturer of Dust Control and Blast Cleaning Equipment

HAGERSTOWN - - - - - MARYLAND

its entire circumference at once. He also pointed out that the most important factor to be considered in setting up for radium inspection is the distance of the radium capsule from the negative. The cost of the process is not exceedingly high since it is possible to rent radium in any amount desired rather than having to purchase the expensive material outright.

Mr. Isenberger showed various slides of X-rays made on parts ranging from small die castings to large pressure valves, and although on large parts it may be necessary to take several exposures where one would suffice with radium, the time of exposure is considerably shorter.

The chapter was given a preview of one of the latest developments in x-ray, known as "trivision" development, by D. Winnek of the Douglas F. Winnek Laboratory. Many unusual three dimensional pictures were shown which cover some of the possible applications of the process.

Next meeting of the chapter will be held Monday, April 5, at the Essex House, Newark, N. J.—*R. E. Ward, chairman, publicity committee.*

Southern California

AN OPEN forum on OPA price regulations was held at the Feb. 17 meeting of the Southern California Chapter of the A.F.A. at the Elks Club, Los Angeles. Earl Anderson, Enterprise Iron Works, Los Angeles, and president of the group, presided. Those present from the Office of Price Administration included: Dr. Arthur G. Coons, California state price officer; Harvey Roney, section chief within the price division, and W. H. Buckingham, price attorney of the local district.

Through the courtesy of the Aluminum Co. of America, the film "How to Machine Aluminum," was shown.—*E. M. Hagener, secretary.*

E. Canada - Newfoundland

A RECORD attendance of more than 150 members and guests of the Eastern Canada and Newfoundland Chapter of the A.F.A. turned out for a free-for-all discussion of foundry problems on Feb. 19 at the Mount Royal Hotel, Montreal, Que.

Under the chairmanship of R. W. Bartram, honorary president, in the absence of Chairman C. C. Brisbois who was ill, a roster of experts were called upon to provide factual, or at least plausible answers to a variety of questions ranging from reasons for greater or lesser shrinkage between nonferrous alloys, to ways of making a thin cast iron plate of large area without warping. Sand qualities and control also came in for prominent consideration.

G. E. Tait acted as question distributor and did an excellent job of handling

them in a sequence to maintain maximum interest on the part of the audience and equitable demands on the experts. Comment on the part of the membership indicated that further programs of this type would be welcome.—*A. E. Cartwright.*

Pittsburgh

EVERYTHING in the core room was discussed at the February meeting of the Pittsburgh Foundrymen's Association held at Hotel Fort Pitt on Monday, Feb. 15. L. P. Robinson, Werner G. Smith, Cleveland, led the discussion on core room problems, which was accented particularly on the needs of foundries to maintain good production records in the war effort. There was considerable discussion on the problems facing gray iron or nonferrous foundries which have suddenly been switched over to steel casting production, and also an intensive discussion on the part moisture plays in the core sand.

The association was considerably grieved to learn of the death of Frank J. Lanahan on March 2. President of Fort Pitt Malleable Iron Co., Mr. Lanahan had for many years been an active member of the association.—*R. L. Hartford.*

Reading

REGULAR meeting of the Reading Foundrymen's Association was held at the Berkshire Hotel, Reading, Pa., Feb. 16, with Herman P. Good, president, presiding.

Speaker of the evening was E. George Brewer, foundry engineer, Taggart & Co., Philadelphia, and his subject was, "Some Facts About Natural and Synthetic Molding Sands for Gray Iron Molding." He said the natural bonded Jersey sands have a high silica grain bonded by clays possessing high sintering points. Quite a few jobbing foundries in that area use natural bonded Jersey sands. New Jersey natural bonded sands require 5 to 7 per cent moisture to bring to temper, depending on their clay content. Sound castings have been produced using 100 per cent new sand with 16 per cent clay content.

Natural bonded Jersey sands have good durability. Mr. Brewer mentioned a test on five tons of natural bonded sand mulled with 6 per cent sea coal to which only water was added over a three-month period. That sand was used by two bench molders on miscellaneous castings five days a week. At beginning of the test the moisture was 6 per cent; permeability 100; green strength 14 pounds per square inch; and clay content 16 per cent.

After three months the moisture was 5.8 per cent, permeability 93 and the green strength 7.5 pounds per square inch. Natural bonded sand has plenty of dry strength for green sand molding. If the green strength is kept up in the facing, the dry strength will be enough

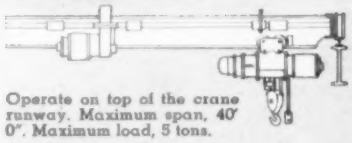
Move it over *Here*

NO extra time for re-handling here. A Shepard Niles Single-Beam Crane covers every square foot of the bay with vertical lifts. Side pulling and dragging of the load is eliminated. The crane covers the length of the bay, while the hoisting unit covers the width. Thus, fast, accurate and economical handling of materials is afforded through Single-Beam Cranes, where conditions do not require, nor clearances permit, installation of a Double-Beam Crane.

Available in over-running, inner-running or under-running construction—with push button, or pendent rope control. Handle all loads from ¼ to 10 tons.

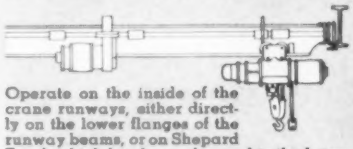
Call in our nearest representative. He will gladly cooperate with you in determining where important materials-handling economies can be made.

OVER-RUNNING SINGLE-BEAM CRANES



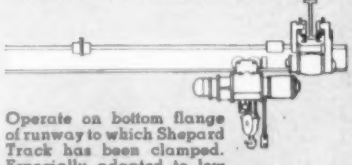
Operate on top of the crane runway. Maximum span, 40' 0". Maximum load, 5 tons.

INNER-RUNNING SINGLE-BEAM CRANES



Operate on the inside of the crane runways, either directly on the lower flanges of the runway beams, or on Shepard Track which has been clamped to the lower runway flanges. Maximum span, 40' 0". Maximum load, 5 tons.

UNDER-RUNNING SINGLE-BEAM CRANES



Operate on bottom flange of runway to which Shepard Track has been clamped. Especially adapted to low head-room areas. Crane runway can be hung direct from roof trusses, eliminating supporting columns, saving vital materials, time and expense. Maximum span, 40' 0". Maximum load, 10 tons.

Write for Bulletin 130

Shepard Niles

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SWEATING ROBS THE BODY OF SALT
-5% LASSITUDE
-10% LOSS OF WILL TO WORK*
-20% EFFORT FORCED*
-30% DIZZINESS*
-40% HEAT CRAMPS
-50% PROSTRATION
*HEAT-FAG
THAT IS WHY AMERICA'S LEADING MANUFACTURERS FURNISH SALT TABLETS TO WORKERS

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Beware of Heat-Fag. It is a dangerous, insidious force that brings on fatigue — renders men inalert—slows down reactions. Often it is the direct cause of industrial accidents. As salt is sweated out, the worker tires, becomes careless — a slight miscalculation — and another costly accident is chalked up. Heat-Fag has again taken its toll.

Production-minded men know that Salt Tablets are a "must" for workers who sweat and do hot work. That's why they are always available in leading industrial plants... why they are recognized as the simple, easy and sanitary way to replace the body salt sweated out.

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(about 30 pounds) to give clean castings free of cuts and washes. To get the best dry sand qualities, the sand should be worked on the wet side of temper.

Natural bonded Jersey sand has very good expansion characteristics. A dilatometer test on a medium coarse grade gave a maximum expansion of 0.016-inch per inch. After a 9-minute soak at 2500 degrees Fahr., the sand had no contraction whatever. At the end of the test, the expansion was only 0.004-inch. After removal from the furnace the test specimen fell apart, indicating a high sintering point.

To retain maximum permeability, the grain size of the sea coal should be comparable to the grain size of the sand. An addition of 5 per cent by weight of a grade D sea coal lowered the permeability from 99 to 58.

Dry strength of natural bonded sands can be increased readily by pitch additions. Care must be exercised that the sand possesses enough permeability to allow the escape of the gas generated from the pitch.

Mr. Brewer stressed the importance of proper ramming. If a facing sand has a green strength of 7 pounds per square inch at 85 mold hardness, which is average on the laboratory rammers, and the molder rams the sand in a mold to only 55 mold hardness, then the sand in the mold will have a green strength of only 4.1 pounds per square inch, instead of 7 pounds per square inch, and would not be strong enough to resist cutting and washing. Mr. Brewer cited numerous experiences where the proper choice of natural bonded New Jersey sands had solved molding problems in various gray iron foundries.—*H. C. Cummings, secretary.*

Chicago

ROUNDTABLE discussions continue to prove popular with the Chicago Chapter of the A.F.A., the third series in the year's program, on March 1, attracting an attendance of nearly 175. Five groups—steel, gray iron, malleable iron, nonferrous, and pattern divisions—held sessions simultaneously. Particularly outstanding is the sustained interest being displayed by the nonferrous and pattern divisions, both of which were re-established last fall, following a long period of waning activity.

The nonferrous division roundtable had as its chairman Chester Faunt, Christensen & Olsen Foundry Co., Chicago, and E. D. Mooney, Federated Metals Division, American Smelting & Refining Co., Whiting, Ind. The subject of the discussion was "Nonferrous Melting."

H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind., was chairman of the pattern division, and Arthur Koehler, chief of the Division of Silvicultural Relations, Forest Products Laboratory, United States Department of Agriculture, Madison, Wis., was the discussion leader on "Substitution of Materials in Pattern Construction." Mr

Koehler described the various types of wood which are available to replace metals in metal patterns and scarce woods in wood patterns.

Barney C. Yearley, foundry superintendent, National Malleable & Steel Castings Co., Cicero, Ill., was both chairman and discussion leader at the malleable iron roundtable, with the topic "Current Sand Control Practices."

J. A. Gitzen, president, Delta Oil Products Corp., Milwaukee, was discussion leader for the gray iron division, on the subject "Cores—Materials, Equipment and Results." N. L. Mooneyham, Velsicol Corp., Chicago, was discussion leader.

"Salvage and Substitute Materials" was the topic for the steel roundtable at which H. A. Forsberg, general superintendent, Continental Roll & Steel Foundry Co., East Chicago, Ind., was both chairman and discussion leader. To start the ball rolling, Mr. Forsberg related some of the notable achievements of his company between February and December, 1942, in connection with a salvage campaign in order to illustrate what can be accomplished in that direction.

During the 11-month period, he reported that 528 tons of steel scrap, including old machinery and flasks, was accumulated. Other salvage was 76 tons of iron, 6 tons of alloy steel rods and crop ends, 2 tons of copper, 9 to 10 tons of brass, and 75,000 grinding wheel stubs. The speaker pointed out that through use of the dilatometer and Jominy end-quench tests, invaluable aid had been attained in effecting savings in the use of alloys going into castings.

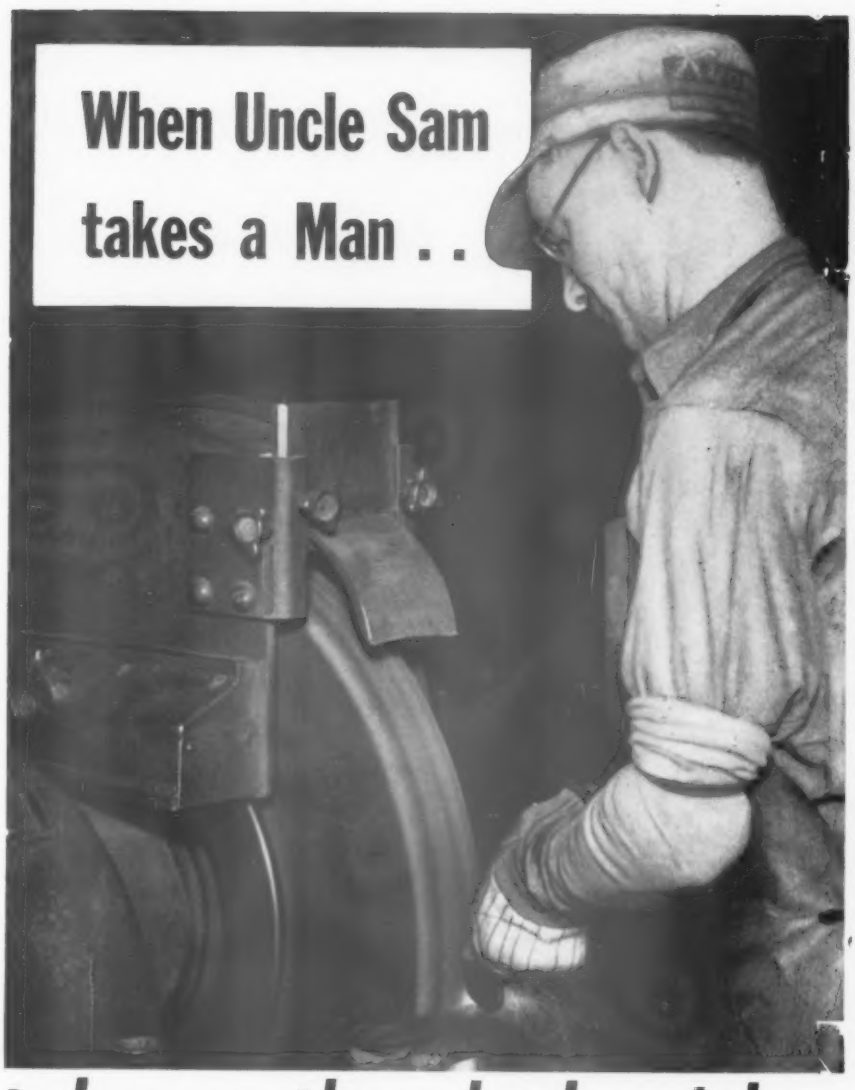
Because of current scarcities, more attention is being paid to conservation of both equipment and supplies, including such items as corn flour, thermocouples and tubes, and stopper rods. The Continental company makes its own chipping chisels, analyzing the steel as it is received, and then heat treating the analyses accordingly. As further aid, better temperature controls were put on heat treating furnaces in the blacksmith shop. Further saving was obtained by substituting cable for lifting chains.

Greater emphasis also was placed on maintenance work, Mr. Forsberg stated. For example, more care is taken of ball and roller bearings. A metallizing unit, formerly used in production work has been pressed into service to build up worn parts, such as shafts. Air hoses are treated more kindly, and protected from hazards.

As a result of the salvage experience, Mr. Forsberg said the company will always have a salvage department, for it will pay dividends in peace as well as wartime.

Subsequent general discussion elaborated on points which had been brought up. Among new subjects introduced were the possibility of using boron to effect economies in alloys, and more extensive use of sand control to reduce purchase of new sand.

Max F. Becker, vice president, Whiting Corp., Harvey, Ill., has been nominated



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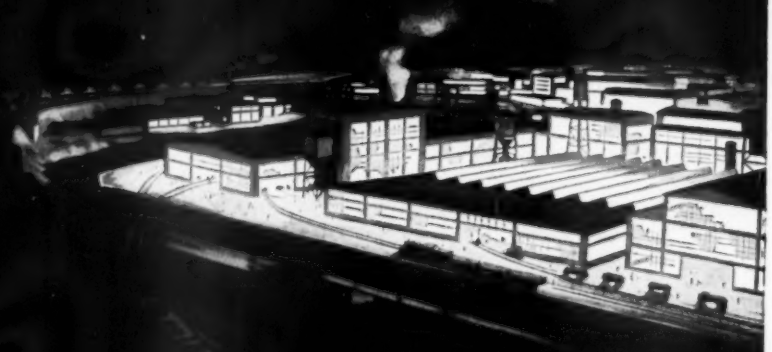

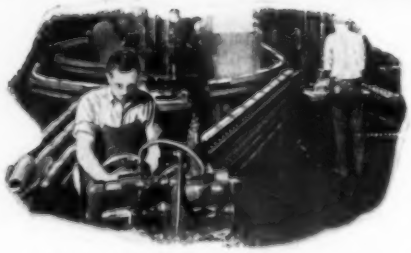

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STANDARD

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chairman of the Chicago Chapter for 1943-44, to succeed A. G. Gierach, works manager, American Manganese Steel Division, American Brake Shoe & Foundry Co., Chicago Heights, Ill. Mr. Becker has served as vice chairman and chairman of the program committee during the past year.

Nominee for vice chairman is Arthur S. Klopf, vice president, Hansell-Elcock Co., Chicago. The chapter's secretary Frank E. Wartgow, production engineer, American Steel Foundries, East Chicago, Ind., was renominated and Charles C. Kawin, president, Charles C. Kawin Co., Chicago, was named to continue as treasurer.

Nominees for directors for three years are as follows: D. H. Lucas, sales representative, Chicago; Chester Faunt, Christensen & Olsen Foundry Co., Chicago; H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind., and Retiring Chairman Gierach. W. L. Hartley, sales engineer, Link-Belt Co., Chicago, was named to serve as a director for two years to finish the unexpected term of Mr. Klopf.

Next meeting of the chapter will be April 5 at Museum of Science and Industry. Major Lenox R. Lohr, president of the museum, will address the dinner audience, after which parties will be taken on tours. The foundry, which was installed largely through efforts of the chapter several years ago, will be in full operation during the evening. A number of improvements have been made in the foundry during the past year.—*Erle F. Ross.*

St. Louis

USUAL refreshments and dinner preceded the Feb. 11 meeting of the St. Louis District Chapter of the A. F. A. held at the DeSoto Hotel, St. Louis. Chairman C. B. Shanley, Semi-Steel Casting Co., St. Louis, presided.

Emil Goerger, chairman of the apprentice training committee, requested that reports on entries to the apprentice training contest be turned in as soon as possible. He stated that there must be at least three entries in each class. Classifications are gray iron, steel and nonferrous molding and patternmaking. Mr. Shanley then explained the rules of the contest and announced that the St. Louis Chapter would award prizes of $10, $7.50 and $5 for the first, second and third place winners in each group. Walter A. Zeis, chairman of the membership committee, introduced three new members.

L. J. Desparois, chairman of the general committee of the Foundry War Production Congress, reported that the complete general committee had been set up and that all subcommittees would have their first meeting on or before March 1.

Mr. Shanley announced that due to the sudden illness of the scheduled speaker, Pat Dwyer, engineering editor of THE FOUNDRY, Cleveland, it was necessary to make a last minute change

in the program, which was as follows: Round table discussions — steel foundries, Chairman, Luther Kleber, General Steel Casting Co., Discussion Leader, Fred Riggan, Key Co., subject, "Effect of Various Ingredients on High Temperature Properties of Sand"; gray iron foundries, Chairman, R. A. Jacobsen, Carondelet Foundry Co., Discussion Leader, W. E. Illig, Banner Iron Works; nonferrous foundries, Chairman, A. L. Hunt, National Bearing Metals Corp., Discussion Leader, J. F. Gilbert, Gilbert Foundry Co., subject, "Nonferrous Foundry Problems".—*J. H. Williamson, secretary-treasurer.*

Cincinnati

A REGIONAL clinic for the discussion of maximum price regulation No. 125 (revised) was held at a special meeting of the Cincinnati District Chapter of the A. F. A. on Feb. 10 at the Cincinnati Club. The regulation, which arbitrarily reduces the price of copper base castings 1½ cents per pound and aluminum castings 3 cents per pound was discussed by the following speakers who headed the open forum: O. S. McCorison, chief of fabricated products, Nonferrous Branch, OPA; Joseph Meier, chief, foundry unit, Nonferrous Metals Branch, OPA; Fred Wolf Jr., chief legal counsel for Nonferrous Branch, OPA; Morris Koblitz, nonferrous price specialist, OPA regional office, Cleveland; and H. A. Baker, district price officer, OPA, Cincinnati office.

There were 100 present at the meeting, a number of which were out-of-town guests who were attracted by the meeting, the first of its type to be called. Visitors were present from Pittsburgh, Buffalo, Chicago, Cleveland, Toledo, Indianapolis, Louisville, Columbus and Lima. The purpose of the meeting was a service of the Cincinnati Chapter to its members and the foundries in the area. In opening the discussion, Mr. McCorison reviewed briefly MRP No. 125 (revised) and the balance of the evening was a round-table discussion.—*E. H. King, vice chairman.*

One hundred members and guests were present at the March 8 meeting of the Cincinnati Chapter at the Cincinnati Club. H. C. Lamker, superintendent of foundries, Wright Aeronautical Corp., Paterson, N. J., was the principal speaker at the meeting, his topic being "Magnesium and Aluminum".

A special guest was C. E. Westover, executive vice president of the A.F.A., who was introduced by Frank E. Hutchinson, Reliance Foundry Co., Cincinnati, and chairman of the chapter. Mr. Westover spoke briefly regarding the war production congress of the association which is to be held in St. Louis, April 28, 29 and 30.

David L. Longenville, Wright Aeronautical Corp., Cincinnati, and a director of the Cincinnati group, introduced Mr. Lamker. The speaker presented his subject under the following three main

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subdivisions: What makes good aluminum and magnesium castings; defects in castings and how to avoid them; and post-war prospects. Since time did not permit covering all items in detail, he did touch upon: Types of melting equipment; control of temperature in different types of furnaces; tendency to remelt all scrap into ingot to eliminate impurities and give better temperature control; fluxes, sand; milling; gating and risering; design for good castings.

Because of the many recent developments in casting aluminum and magnesium, the large and interested audience was comprised of men from both ferrous and nonferrous foundries. Many questions were brought up in the discussion period which followed.

Various foundry movies will be presented at the April 12 meeting of the chapter to be held at the Cincinnati Club.—*Henry M. Wood, secretary.*

Northeastern Ohio

APPROXIMATELY 130 members and guests of the Northeastern Ohio Chapter American Foundrymen's Association attending the March 11 meeting at the Tudor Arms, Cleveland, heard A. W. Gregg, Executive Engineer, Equipment Division Whiting Corp., Harvey, Ill., discuss "The Cupola's Place in Steel Production Today."

Before the technical session started, vice chairman James G. Goldie announced the appointment of a nominating committee made up of past presidents of the chapter to select a slate of officers for the coming year. Popularity of certain programs during the past year influenced the directors in the decision to present another quiz night at the April meeting. Formality will be relaxed at the May meeting when the Old Timers will be recognized as guests by the Young Timers and Some Timers.

Mr. Gregg pointed out that the present day controls for converter steel and especially the ability to produce low sulphur steels has brought about a revival of interest in the use of the converter. He stated the quality of converter steel, according to impartial tests, is equal to that of steel made by any other process. All processes can produce good steel if properly operated and conversely any process will produce inferior steel if not properly operated. Advantages of the converter steel making process include: Production of high quality steel at high temperature, flexibility of operation, ability to desulphurize and in some instances dephosphorize, insignificant demand charge, continuous supply of steel when used in connection with electric furnace, ease of training operators. Touching on the last item he referred to the electric eye which automatically and accurately controls the flame and eliminates the variable human element.

One of the disadvantages of the converter method is the large loss as compared with other methods. However, a large part of the blowing loss includes 3.00 to 3.25 per cent carbon, 1.50 to 2.25 per cent silicon, 0.50 to 0.75 per cent manganese a total of approximately 6.00 per cent which should be deducted from the total blowing loss which ranges from 10 to 15 per cent. The speaker devoted considerable time to a discussion of proper cupola operation. He also referred to the triplex method in which the metal is melted in the cupola, blown in the converter, finished in the ladle and then delivered to an electric furnace. A motion picture showing the operation of two large cupolas supplying hot metal as part of the charge in open hearth furnaces concluded the program. In response to the speaker's invitation a considerable amount of lively and at times controversial discussion enlivened the proceedings.—*Pat Dwyer.*

Philadelphia

FEBRUARY meeting of the Philadelphia Chapter of the A. F. A. was held at the Engineer's Club, Feb. 12, and was jointly conducted by the Philadelphia Chapter of the American Welding Society. The 250 members and guests of both groups who attended heard two fine talks. One was by Michael Dorizas, traveler and lecturer of political history, who talked on the pres-

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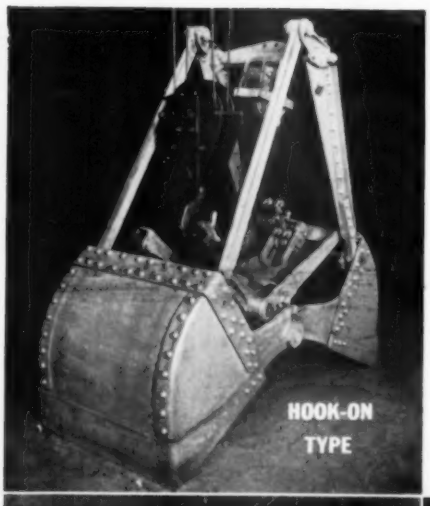

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ent war situation in Europe and the possible effects that it would have on those countries.

Technical part of the meeting was handled by Paul Ffield, materials engineer, Ship Building Division, Bethlehem Steel Co., Quincy, Mass. Mr. Ffield, with the aid of numerous slides, told an interesting story regarding the advancement made in welding technique, particularly applied to ship building and principally to steel castings. Mr. Ffield discussed the early work of the ship builder in the radiography and repairing of steel castings. He explained the extent of that work and how welding later was used to simplify foundry problems. Examples were shown of complicated castings which were subdivided into simple-to-cast components. The individual castings then are welded together either at the foundry or at the shipyard. Mr. Ffield showed that both welding and casting have their proper place in industry. Better results are obtained if instead of replacing the one with the other, each is used to complement the other.

Mr. Ffield explained how it is only a matter of time before the experience gained in the welding of steel castings is used to salvage castings which have been machined and which sometimes have been in service. At the Fore River Yard of the Bethlehem Steel Co., considerable work is being done along these lines. Slides were shown illustrating the salvaging of finished machine castings weighing up to 90 tons by the use of a proper welding and heat treatment technique to avoid or correct distortion. He also explained how that experience was correlated to repair and salvage a battle-damaged steel casting. Some of the unusual incidental problems connected with the welding of ships were explained by Mr. Ffield, particularly the welding of high pressure steam piping including cast fittings. Upon completion of Mr. Ffield's talk, an interesting and educational discussion took place.—*William S. Thomas, chairman, publicity committee.*

Chapter Sponsors Lecture Course

To speed the war through good casting design, the Metropolitan Chapter of the A.F.A. sponsored an educational course of four lectures held at the Woolworth Building, New York during March.

First of the lectures related to properties of cast metals with T. D. Parker, metallurgical engineer, Climax Molybdenum Co., New York, and W. E. Martin, metallurgist, Sperry Gyroscope Co. Inc., Brooklyn, as speakers. The second meeting featured a discussion on selection of cast metals by J. B. Godshall, assistant metallurgist, Ingersoll Rand Co., Phillipsburg, N. J. "Intelligent Design" was the topic of the address by R. E. Ward, assistant chief metallurgist, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., at the third lecture; and at the fourth the subject was, "Expediting Army-Navy Approval of Re-Designs," with T. J. Little, conversion engineering section, New York Ordnance District as one speaker, and representatives of the Navy and Army Air Force also present.

Publishes Booklet

Metropolitan Life Insurance Co., Policyholders Service Bureau, New York, has prepared a 27-page booklet entitled, "Washroom and Locker Room Facilities." Sudden expansion of personnel and the increasing number of women employed in plants have created acute problems. Various considerations in enlarging dressing room, washroom and locker room facilities and in reallocating space, are considered in the publication. The report discusses floor plans for dressing rooms, locker rooms and lavatories, with minimum space requirements as laid down by the sanitary codes. Various types of equipment are discussed and are accompanied by photographs of installations.

Republic Steel Corp., Cleveland, has issued a 76-page booklet giving information on the properties, treatment and application of "NE-National Emergency Steels."

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the foundry war production conference meets to discuss the part of castings in the production of implements of war.

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WASHINGTON NOTES★★★★

GREATER use of gray iron and malleable iron castings will be permitted in manufacture of pipe flanges, as the result of an amendment by WPB to Schedule 2 of Order L-42. The amended schedule lists flange sizes which may be made of gray iron or malleable. It also permits production of malleable iron screwed flanges, blind flanges, reducing screwed flanges and lap joint flanges in those pipe sizes in which gray iron is allowed. Gray iron lap joint flanges are permitted in additional pipe sizes.

• • •

PD-1A forms should be filed with the applicant's nearest WPB district office henceforth, instead of at Washington. This application for preference rating—usually to purchase capital equipment—is the "catch-all" form employed when the use of no other form has been specifically directed. District offices will "screen" the applications and forward them either to their regional office or to Washington. After April 15 regional offices will process forms involving up to $500, the larger requests going to Washington. Regional offices expect to give 12 to 48-hour service on such applications, instead of the week or more previously required for clearance through Washington.

• • •

Foundry equipment and supplies were omitted from Schedules I and II of CMP Regulation No. 5 (Maintenance, Repair and Operating Supplies), but this omission is being corrected. Advice from Thomas Kaveny Jr., Chief, Foundry Equipment and Supplies Section of WPB, is as follows: "Foundry machinery equipment and repair parts for foundry equipment are listed on Schedule I under 'Machine tools and metalworking machinery, including: bending, forging, cutting, shearing, rolling, milling and pressing machinery.' Foundry supplies are listed on Schedule I under three headings—'Iron unfabricated and semi-fabricated products, including: forgings, pig iron, pipe, wire, wrought iron and foundry products,' 'Steel unfabricated and semifabricated products, including: bars, forgings, pipe, rolling mill and foundry products, sheets, strips, structural steel, tubing, and railroad rails, frogs, switches and crossings' and 'Nonferrous metal unfabricated and semi-fabricated products.'"

• • •

All shipments of war materials and supplies, whether scheduled for immediate shipment overseas, or for delivery to storage and subsequent shipment overseas, must comply with new packaging requirements set up by WPB. A booklet, "Army-Navy General Specifications for Packaging and Packing for Overseas Shipments," available from the WPB Containers Division gives the necessary instructions.

• • •

Pig iron supplies for the foundry industry this year will not be increased in proportion to the expansion in blast furnace capacity. The new stacks are not being completed as rapidly as was expected; their output will be required largely for the added steelmaking capacity, and shutdowns for repairs will tend to curtail production by existing furnaces. Last year 45 blast furnaces went down for relining, but the months of heavy production may require 70 to 75 stacks to be stopped this year for such repairs.

• • •

Producers of gray iron castings who wish to adjust their maximum prices must follow the procedure laid down by OPA recently in Amendment 3 of Maximum Price Regulation 244. Among other

Speed up Production with

TRANSITE Core Plates

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things, the producer must demonstrate that prices he wishes to raise are inadequate to warrant continued production and that the castings are necessary to the war effort. Applications for adjustment must be submitted on Form 344:3-A or 344:3-B, or on both forms, and filed with the nearest OPA regional office. Copies of these forms may be obtained from OPA at Washington or at any field office.

• • •

A bulletin prepared to give a brief nontechnical explanation of the national apprenticeship program has been issued by William F. Patterson, director, Apprentice-Training Service, War Manpower Commission, Washington. It is intended to provide answers to most of the inquiries received by the Service from employers, teachers and employment offices. Requests for information regarding technical problems or assistance in setting up a training program should be addressed to the Service at Washington or at one of its 12 regional offices.

• • •

Shippers are being urged by the Office of Defense Transportation to remove dunnage, nails, strapping and other debris from freight cars after unloading them. It takes from three to five days for a car to be switched from a plant to the cleaning track and then reswitched to another plant for loading. If shippers will clean cars thoroughly before returning them to the railroad much valuable car-availability time will be saved.

• • •

The pool of new commercial motor vehicles held for rationing for indirect military demands and the most essential civilian needs is down to about 57,000 units. This compares with 1939 production of 710,496 trucks. Depleted state of the reserve indicates the necessity of extra care in maintaining equipment already in service.

• • •

Regional loan agents of the Smaller War Plants Corp. now have authority to make loans in the field up to $25,000 to manufacturers holding prime contracts or subcontracts for war work or essential civilian needs, and who need additional working capital or facilities.

• • •

Iron and steel scrap collections the second half of 1942 were 95.7 per cent of the national quota of 17,000,000 tons, according to the WPB Salvage Division. Visible stocks at the end of the year were 10 per cent ahead of the 7,000,000-ton objective set last summer. However, some officials predict the supply of good cast scrap will continue short.

• • •

Manufacture of window sash-weights now is permitted by WPB for sale to holders of an A-10 or better priority rating. Order M-126, imposed last Nov. 5 to restrict such manufacture, was lifted when producers guaranteed that noncritical metals to be used hereafter would be a grade of scrap so low as to be unacceptable to steel mills and blast furnaces.

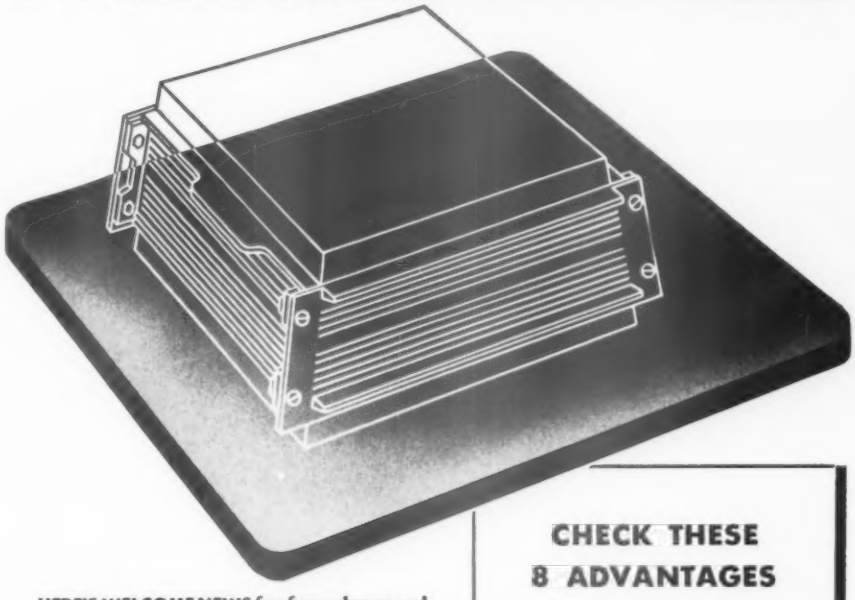
Organize Aluminum, Magnesium Group

Aluminum and Magnesium Division Advisory committee of the American Foundrymen's Association met at Cleveland recently for the purpose of formulating an organization intended to serve producers of aluminum and magnesium castings. Dr. N. E. Woldman, chief metallurgical engineer, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., general chairman of the division, presided.

R. E. Kennedy, A.F.A. secretary, acted as secretary pro tem and reported on the program sponsored by the division at the 1943 War Production Foundry Congress. Leslie Brown, Magnesium Fabricators Division, Bohn Aluminum & Brass Corp., Adrian, Mich., was appointed vice chairman of the advisory committee, and R. E. Ward, Eclipse Foundry Division, Eclipse Aviation, Bendix, N. J., was named secretary, with Dr. Woldman continuing to serve as chairman. Appointments to the following committees were made: Sand castings, die castings, permanent mold castings, reclamation and alloying, plaster molding, program and papers, and representatives on A.S.T.M. Committee on radiography.

Improve Foundry Practice with

FOUNDRITE *Bottom Boards*



HERE'S WELCOME NEWS for foundrymen! The makers of Transite Core Plates now bring you a companion product—Johns-Manville Foundrite Bottom Boards. These new, improved bottom boards, made of asbestos and high heat-resisting bonding agents, offer you eight important advantages—listed at the right. Throughout the pouring operation they provide a uniform foundation for the mold.

By reducing breakouts due to mold failures, they help safeguard production schedules and improve foundry practice. For complete details, write today for brochure No. PP-10A. Johns-Manville, 22 E. 40th Street, New York City.

CHECK THESE 8 ADVANTAGES

1. High Heat Resistance
2. Low Warpage
3. Strong and Durable
4. Light Weight
5. Easy to Machine
6. Easy to Clean
7. Economical
8. Non-Critical Materials

JM PRODUCTS

Johns-Manville

FOUNDRITE Bottom Boards

READER'S COMMENT

Readers are invited to comment upon articles and other editorial material appearing in THE FOUNDRY. *The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief.*

THE EDITORS

Salvage Items Deductible

TO THE EDITORS:

We were informed that several business publications were urging various industries to contribute machinery and equipment, dies, and other items containing essential materials, to Federal, State and Local Salvage Committees organized to aid in the war effort.

The question arose in the minds of various editors and readers as to just what treatment should be accorded such donated equipment, in computing net income for Federal Income Tax purposes. It appeared that in several instances, the various items of equipment so contributed, had an undepreciated cost for accounting and income tax purposes, and these various contributors wanted to know if they could deduct such undepreciated costs as an expense in computing net income.

It was our opinion that this would constitute a fully deductible item under the provisions of the tax law relating to abandonment of property. However, the question has a very wide application, and because of the possibility that the Treasury Department might rule that the deduction would be limited to and confined to the allowable deductions for "contributions," we determined that we would make an application for ruling to the Commissioner of Internal Revenue. The application for ruling was filed October 26, 1942.

The Commissioner ruled that the undepreciated cost of the machinery or equipment is fully deductible for income tax purposes. Further, in effect, the ruling went on to state that the deduction would not be limited to 5 per cent of net income to the corporation, or 15 per cent of net income in the case of individuals, as provided under the law for donations to United States or any subdivision thereof, charitable, religious, or educational organizations.

Summarizing this ruling, it can be stated that the undepreciated cost of any asset used in the trade or business which is donated to Salvage committees, is fully deductible for income tax purposes in the year in which such donation takes place. This deduction is in the nature of an abandonment loss resulting from the discarding of the asset.

J. K. LASSER

New York

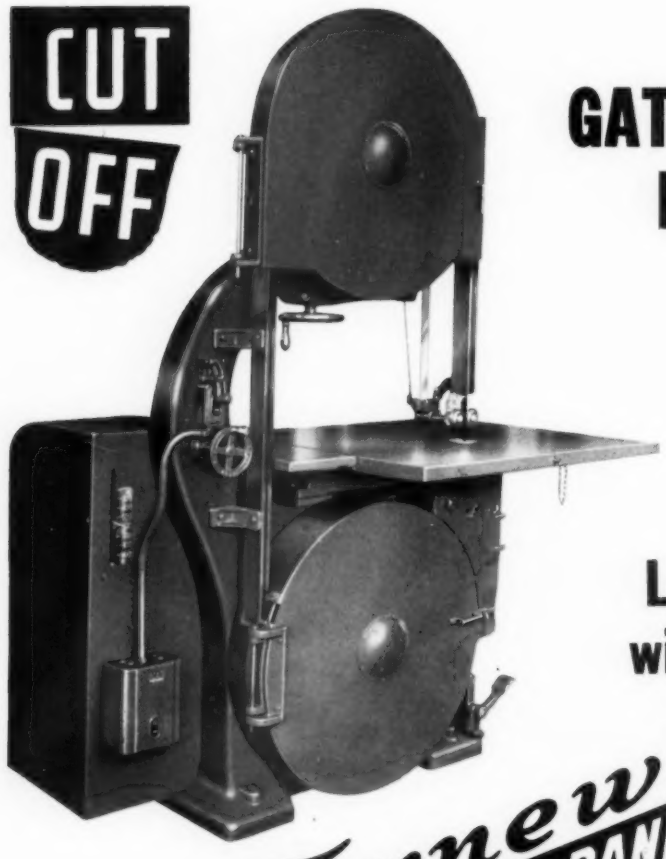
A Theory on Cold Shuts

TO THE EDITORS:

After observation and some thought, relative to so called "cold shut" in castings, I venture the following. Before proceeding I copy from an encyclopedia, the following.

The Ionic Theory, by S. A. Arrhenius: Ion, one of the electrified particles into which, according to the theory of electrolytic dissociation, the molecules of electrolytes become divided by the action of water and other solvents. An ion has one or more atoms, with a unit charge of electricity. Positively charged ions are cations; negatively charged ions are anions. The cations are attracted toward the cathode, the anions toward the anode.

Generally, a cold shut, is that region of a mold wherein the metal failed to flow, to form a homogeneous mass. Therefore, I am assuming that, the uncast region of the mold is surcharged with either positive or negative electrons or ions. And further that these in turn act as a repellant to the molten metal, and in this way contribute to a condition of cold shut.



CUT OFF

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine available in any 3:1 speed variation from 100:300 or 1000:3000 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

If this be true in one type of metal, it would be true in any other type of metal also. That is in any metal whose properties have some degree of conductivity. Also it may prove to be true in metal molds as well as in sand molds.

Therefore, it seems plausible that the proper placement of anodes or cathodes within or near the mold, would or should give added impetus to the flowing metal. Further, the creation of a magnetic field and proper location of the same should assist in the flow of metal.

In the event that experiments for these conditions are exercised, I would advise extreme caution, where electric current is used. Any current would flow through the metal and into the ladle or ladles, and possibly injure the pourer.

IVAN OLSEN

403 Washington Avenue
Muskegon, Mich.

Froze Both Ears

TO THE EDITORS:

Somewhere in his interesting memoirs Pat Dwyer's old friend Bill refers to a cold winter he spent in Montreal. Other writers also have touched on the subject. Readers of William Henry Drummond will remember the col', col' day, poor, shivering, home coming Ba'tiste stepped off the freight caboose in Trois Riviere. No balmy breeze was blowing the night the Julie Plante was wrecked in Lak Pierre one arpent from the shore. And of course every person is familiar with the famous man from Kebeque who fell into snow up to his neque. When they asked "Is you friz?" he said "Yes I is, but we don't call this cold in Kebeque."

This sterling young man would have sung a different tune had he been here

Monday Feb. 15 with a temperature of 30 below zero and a chilling gale from the Laurentians sweeping over the city. About one third of our men did not come in to work. Water and air pipes were frozen and the sand froze to the patterns. This Canadian climate gives one pause to think of steel foundries in localities not too far from the equator.

The electric ingot shop was shut down over the week end and started up cold at midnight Sunday. While pouring the first heat early Monday morning the ladleman had both ears frozen, as shown in the accompanying authentic and spirited illustration prepared by a fellow workman who is prepared to make affidavit that he actually witnessed the remarkable phenomenon.

CHARLES F. PASCOE

Canadian Car & Foundry Co.
Montreal

Awarded White Star

Ohio Injector Co., Wadsworth, O., which was awarded the Army-Navy "E" last summer, has had a white star added for continued high achievement in the production of war goods.

Production Records Are Recognized

Foundries and foundry equipment and supplies manufacturers which have received recognition for their production records of war materials by being awarded the Army-Navy "E" recently, include:

Caterpillar Tractor Co., Peoria, Ill.; Desmond-Stephen Mfg. Co., Urbana, O.; International Harvester Co., Tractor Works, Chicago; Lindberg Engineering Co., Chicago; Mathieson Alkali Works, Niagara Falls plant, Niagara Falls, N. Y.; Oliver Farm Equipment Co., Springfield, O.; Saco Lowell Shops, Biddeford, Maine.

HAUSFELD
METAL MELTING
FURNACES

...MAKE COKE PIT FURNACES OBSOLETE

The battery of Hausfeld stationary type Crucible furnaces shown above is one of many recently made in brass foundries formerly operating coke pit furnaces.

Burning gas or oil, each furnace is a self-contained, independent unit, individually controlled by its own motor and blower. Each furnace may be used for melting a different mix, brass, bronze or other copper alloy. All furnaces may be operated at once, or any one may be shut off at will, with immediate saving of fuel.

The superior flexibility of Hausfeld Furnaces is due both to perfect combustion and to mechanical construction. Crucibles and linings last longer; metal losses are minimized; melting time is reduced; output is increased and costs are cut.

Types and sizes for all non-ferrous metals, tested before shipment.

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

FOUNDRY ACTIVITIES

COOPER-BESSEMER CORP., Mount Vernon, O., has developed a training plan for developing employes' education along specific lines. Ralph L. Boyer, the organization's chief engineer worked out the details of the program with the co-operation of the original head of the Office of Engineering, Science and Manual Defense Training, Ohio State University, Columbus, O. Subjects, as presented at Ohio State University, cover fundamental engineering drawing, and the engineering essentials of tool, jig and fixture design. Classroom activities, held at the plant, include lectures and laboratory exercises, dimensioning working drawings, recitations and tool design. Three hour sessions are conducted two nights a week, and to complete a course requires from 12 to 16 weeks. Instruction is under the supervision of two veteran employes—one a draftsman and the other a tool designer.

° ° °

Canadian Car & Foundry Co. Ltd., 621 Craig Street West, Montreal, Que., is planning further additions to its Turco works.

° ° °

Singer Mfg. Co., St. Paul Street, St Johns, Que., is installing new equipment.

° ° °

Ampco Metal Inc., Milwaukee, has let contract for a one-story foundry addition.

° ° °

Tanner Brass Works, 1604 West Twelfth Street, Erie, Pa., is planning alterations and improvements to its foundry.

° ° °

National Bronze & Aluminum Foundry Co., 4397 Hamilton Avenue, Cleveland, is planning alterations to its plant.

° ° °

Dominion Wheel & Foundries Ltd., 171 Eastern Avenue, Toronto, Ont., is building a plant addition.

° ° °

Socal Foundry, 1651 Compton Avenue, Los Angeles, is building an addition to its plant.

° ° °

Brass foundry of Klotz Machine Co., Sandusky, O., recently was damaged by fire. The damaged portion was rebuilt.

° ° °

Griffin Foundry Co., Huskisson Street, Guelph, Ont., has let general contract for repairs and addition to its foundry.

° ° °

Atlantic Foundry Co., Akron, O., plans an addition to its foundry. Charles Reyman is president.

° ° °

Hamilton Foundry Co. Ltd., Clinton and Ruth Streets, Hamilton, Ont., is considering the building of a foundry addition.

° ° °

Clark Steel Inc., has been issued a building permit for construction of a steel foundry at 1860 East Gage Avenue, Los Angeles.

° ° °

Rogers Pattern & Foundry Co., 938 East Sixtieth Street, Los Angeles, has awarded contract for construction of an addition to its plant.

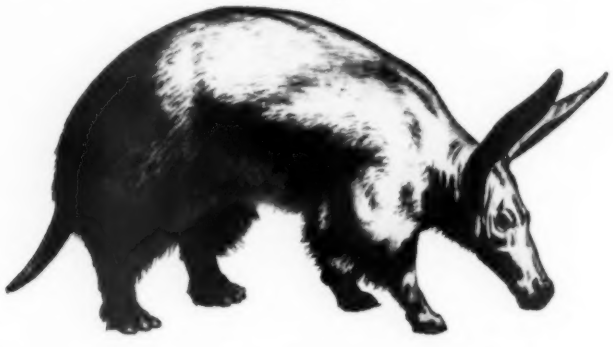
° ° °

Hawkeye Steel Products Co., 325 Dureya Street, Waterloo, Iowa, plans to rebuild the portion of its plant damaged by fire recently.

° ° °

F. G. Issels & Son Ltd., Bulawayo, Southern Rhodesia, South Africa, has been licensed by the Meehanite Metal Corp., Pittsburgh, to manufacture castings by that process. The company is one of the oldest firms in the colony of Southern Rhodesia and manufactures

"What can you say about a thing like this?" said the first man who saw an AARDVARK



WE WOULDN'T KNOW ABOUT THE AARDVARK, BUT THERE'S PLENTY TO SAY ABOUT A SAND CORE BOND

KORDEK

First, KORDEK, is a concentrated starch binder made from corn. Because of KORDEK'S increased strength, you get equal results by using less than you would of an old-fashioned cereal binder. Second, KORDEK cores liberate practically no gases while baking or pouring. Third, KORDEK cores, besides being strong, have sharp, well-defined edges and corners, and show surfaces hard enough to take rough handling. Fourth, no cores run more freely from castings than those made with KORDEK. Fifth. KORDEK is 100% pure and carries no inert material. AND BEYOND THESE BIG POINTS, KORDEK can be used in smaller proportions, produces better castings, fewer discards, less waste and is absolutely reliable.

MOGUL BINDER

is a new, improved, different core and facing binder, producing a good green bond. Cores come clean without sticking. It replaces clay or loam. Used with sharp sand, you get cores that are porous, with natural vents. Use MOGUL in cores requiring both green and dry bond.

CORN PRODUCTS SALES COMPANY

17 BATTERY PLACE, NEW YORK

equipment for gold and other metal mines, municipalities, and industries in Southern and Central Africa.

* * *

Warman Steel Casting Co. Ltd., 6100 South Boyle Avenue, Los Angeles, has awarded contract for construction of an addition to its plant 40 x 100 feet.

* * *

Long Beach Iron Works, 2100 West Anaheim Street, Long Beach, Calif., has been issued a building permit for construction of an addition to its plant.

* * *

Enterprise Foundry Co. Ltd. plant, Sackville, New Brunswick, recently was damaged by fire, with an estimated loss of $100,000.

* * *

Mid City Foundry Co., Milwaukee, has purchased a foundry and office building at 1521 Bruce Street, Milwaukee. The property formerly was owned by the A. E. Martin Foundry Co.

* * *

An addition to an aluminum bronze casting foundry will be erected in Pueblo, Colo., by E. F. Gobatti Engineering & Machinery Corp., 305 South Victoria Avenue, Pueblo.

* * *

American Hoist & Derrick Co., St. Paul, has let contract for alterations and improvements to its foundry to permit installation of additional machinery and equipment.

* * *

Aluminum Pattern & Brass Foundry, 3229 Casitas Street, Los Angeles, is the firm name under which H. O. Huseby, E. J. Zimmerman and W. G. Zimmerman are to conduct business.

* * *

A $6000 foundry and metals school is being built at the Emily Griffith Opportunity School, Denver, Colo. The shop will be equipped by the federal government and the school district will supply money for construction of the building.

* * *

Index of new equipment orders for January, 1943, according to a report of the Foundry Equipment Manufacturers Association, Cleveland, was 394.9 as compared with 319.8 in December, 1942. Index for repairs was 534.9. Index of 100 represents the monthly average of reported sales to metalworking industries during 1937-38-39.

* * *

Waukesha Foundry Co., Waukesha, Wis., in expanding production facilities encountered difficulties because of the need for critical materials for war production. To solve the problem, laminated wood trusses and concrete were used in place of steel and second hand plumbing was utilized in the 60 x 200 foot addition to the foundry. WPB and navy officials complimented the company in having the job done so rapidly and with the use of few critical materials.

Foundry Apprentices Are Graduated

Caterpillar Tractor Co., Peoria, Ill., recently held graduation exercises for its regular indentured apprentices and for apprentices taking special courses. These exercises were held at the Jefferson Hotel, Peoria, Jan. 17 with J. R. Munro, general factory manager, acting as toastmaster. Diplomas for the 4 year foundrymen and for the 4 year patternmakers were awarded by M. J. Gregory, factory manager, foundry division.

The following were graduated in the 4 year foundrymen course: Frank Hamlin, Joe Isoardi and John C. Welch.

The following were graduated in the 4 year pattern course: Jacob Meier, Robert Miller and Clift J. Wikenhauser. Mr. Wikenhauser is in the military service.

Salvage Campaign

More than enough metal to build 2400 M-4 tanks or 70,000 jeeps has been salvaged from the eight plants of Pullman-Standard Car Mfg. Co., Chicago, during 1942. A continuous salvage campaign carried on in all company plants, throughout the year, turned back into productive channels more than 72,000 tons of iron and steel, more than 870 tons of scarcer metals and more than 420 tons of rubber and miscellaneous materials.

We'll Get There!

WE want to let our customers know that we are doing everything possible, short of cycling, to see them and help them as often as possible under the hurry of today's conditions.

Your requests for orders or information on ferro-alloys, pig iron, coal, coke, shot and grit are welcome as always. You will find our sense of responsibility and attention to detail as alert as ever. We are maintaining our nine offices as continual points of contact with our friends in industry.

We only ask that you bear with us if conditions do not seem ideal with reference to your specific demands, and remember we are as anxious as ever to serve you efficiently. We have endeavored, and will continue to do so, to gear our peacetime ideas on good business practice, to wartime conditions. Call on us at any time for help.

Hickman, Williams & Co.

(INCORPORATED)

CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS

FOUNDRY DEVELOPMENTS
At short range

A RECENT suggestion which should be of material aid in reducing serious fires in magnesium heat treating furnaces is the insertion of peep-holes at various levels and locations which permit the inspection of the furnace interior whenever desired. Their value lies in the fact that usually only one casting or piece reaches the ignition temperature, and if it can be detected, the furnace can be opened, and the piece removed before further damage can ensue.

♦ ♦ ♦

Cast steel mortar shell are being made from the following analysis: Carbon 0.26 per cent; silicon 0.40 per cent; sulphur under 0.06 per cent; phosphorus under 0.06 per cent; and manganese 0.70 per cent. Desired physical properties include an ultimate tensile strength of 80,000 pounds per square inch; yield strength of 55,000 pounds per square inch; elongation in 2 inches 18 per cent and reduction of area 25 per cent.

♦ ♦ ♦

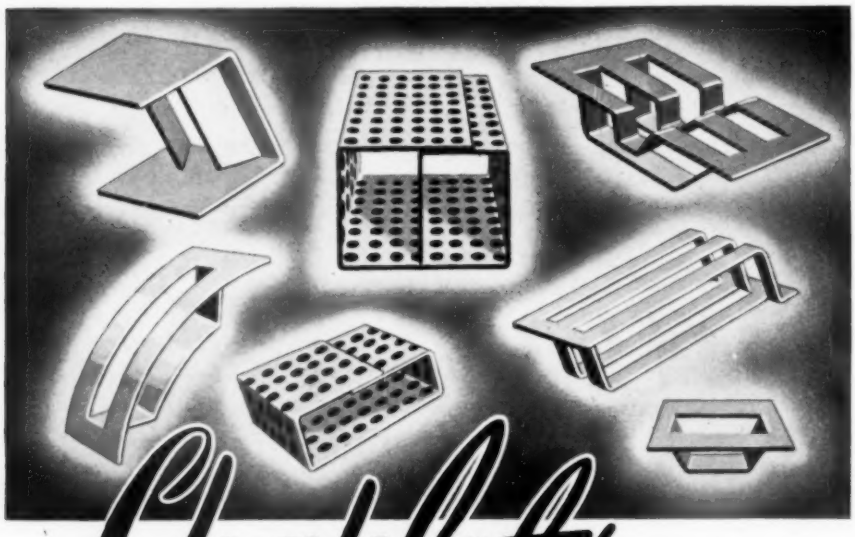
Inability to secure sufficient supplies of bentonite in the British Isles, due to war conditions, has led to investigation for suitable substitutes. It has been found that certain selected and treated varieties of fuller's earth occurring in Somerset and Surrey have bonding characteristics close to those of normal bentonites. The material also can be used satisfactorily as a suspensory agent in silica paint.

♦ ♦ ♦

A RAPID and economical mold drying process is being applied to production of gun metal, manganese bronze, phosphor bronze and brass castings in England, according to the *Foundry Trade Journal*. The practice consists in incorporating the mold dressing or coating in a volatile vehicle which then is ignited, and is said to give excellent results. Mold coating used in the particular case is a proprietary paint containing chiefly silica flour, plumbago, and colloidal clay, but a suitable mixture of silica flour, plumbago, dextrine, and about twice the clay normally used for such a coating or paint will serve. The final mixture or paint is comprised of one part of thick shellac varnish dissolved in 20 parts of methylated spirit (alcohol), and to each quart of that 2 pounds of the dry paint material are added. The liquid paint should not be applied to cores since it dissolves the oil binder. After spraying or brushing on the mixture, it is ignited. The heat of combustion dries out the mold surface, and leaves a thin tenacious coating of shellac.

♦ ♦ ♦

Heat treatment of gray iron has several applications in addition to increasing strength or hardness. It may be employed to surface harden a soft casting



Chaplets

FOR BETTER PRODUCTION

Better production is the aim of every foundryman. While only a detail, Chaplets play an important part in obtaining better production. We, of Milwaukee Chaplet & Mfg. Co., are continually improving our production methods in order to meet the requirements of foundrymen who demand the best.

Ask for samples and prices on Milwaukee Thread Stem Chaplets . . . . Standard Radius Chills . . . . Schmitz Chaplets . . . . Patented Adjustable Radius Chills . . . . Other Chaplets and Foundry Supplies.

Milwaukee

CHAPLET AND MFG. COMPANY

MILWAUKEE • WISCONSIN

or to surface soften a hard casting. Heat treatment may be used to relieve stresses caused by gas being locked in a casting as well as to stabilize dimensions through relief of casting stresses caused by irregular cooling rates in casting sections in the mold.

• • •

WHILE the centrifugal process of casting has been applied to various nonferrous metals and alloys, particularly the bronzes, for some time, apparently little has been done in applying the procedure to aluminum and its alloys. However, it is understood that aluminum alloy cylinders about 12 inches long, 8 inches outside diameter and 1¼-inch wall are being centrifugally cast with success. A metal mold is used, and the inside wall or bore is just as smooth and fine-grained as the exterior wall cast against the mold. Another feature is that the scruff and dross is confined to the top edge in a narrow band which can be machined off.

• • •

A recent development to reduce the amount of metal required to produce uniformly sound castings of high quality, to simplify pouring and gating technique, to effectively skim the metal as it enters the mold cavity, and to feed the casting as it freezes, is described in a recent patent. The device is a combination gate and riser made as a unit with a separator between the two; the separator being perforated near the bottom or at several levels as desired. Preferable construction of the unit is a metal cast lined with plaster of paris because of its insulating values. The separator may be asbestos paper.

• • •

In Australia some experiments were carried out to determine the efficacy of resin obtained from the Australian grass tree as a core binder. The resin known as acaroid or yacca resin was said to have given very satisfactory cores where high contraction is encountered. Laboratory results showed with 2 per cent resin and 2 per cent moisture, the green strength was 1 pound per square inch, and after baking at 350 degrees for 2 hours the dry strength was 224 pounds per square inch. With 5 per cent resin and 3.8 per cent moisture, the green strength was 2.1 pounds per square inch, and after baking the dry strength was over 270 pounds per square inch.

• • •

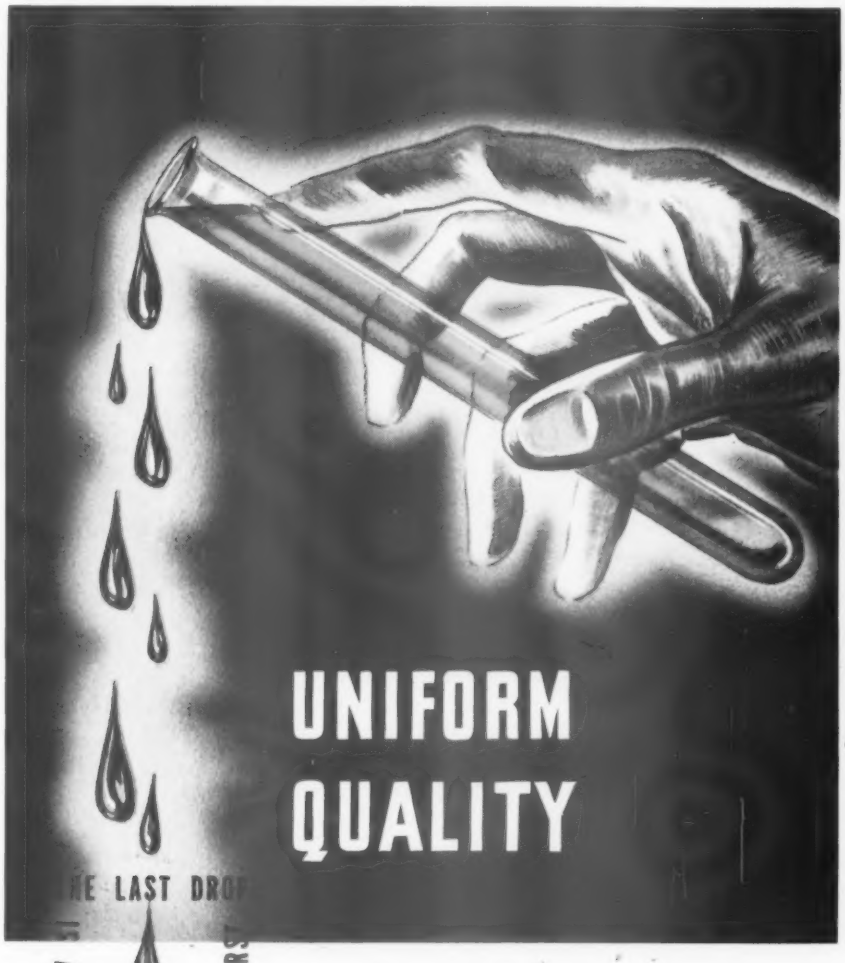
While the FeO-SiO_2 eutectic melts at around 2150 degrees Fahr., one explanation for the efficacy of iron oxide in increasing hot strength of cores is that it forms a glaze which is compressed on a flat plane just beneath the interface core surface, thus lowering the hot permeability sufficiently to retard metal penetration. Since the oxide has acted as a flux, the expansion coefficient of the mixture has been lowered and the tendency to buckle is decreased, and hot strength increases as a result of the glaze.

Protest Nonferrous Casting Prices

Non-Ferrous Founders' Society, 111 West Washington Street, Chicago, which is seeking modification of certain provisions of the OPA regulation covering maximum prices of nonferrous castings, is collecting sales and earnings data from nonferrous foundries to be used in support of its subsequent appeal to Washington for relief from what it claims are inequitable part of the regulation.

In a meeting with OPA officials on Feb. 18, the acting executive committee of the society protested against Revised Maximum Price Regulation No. 125 and challenged the accuracy of certain statistical and other industry information on which, it claimed, erroneous conclusions have been reached. The society maintains that the business volume and earnings of the nonferrous castings industry as a whole is downward, and that OPA indicates its belief production will increase during 1943.

The sales and profits survey, which is intended to include all members of the industry, is being compiled by R. M. McClure, secretary of the Non-Ferrous Founders' Society.



. . always the same

You have a right to expect faithful, continuous, unvarying UNIFORM QUALITY in Core Oils. DAYTON OILS meet *every* test because we insist on the best at all times. Yesterday, today, tomorrow . . . this BETTER OIL is always the same, always good. Our experience is at your disposal. Write today!

THE DAYTON OIL COMPANY • DAYTON, OHIO

MAKERS OF DOCO BINDER & CORE PASTE • DOCO STEEL CORE & MOLD WASH

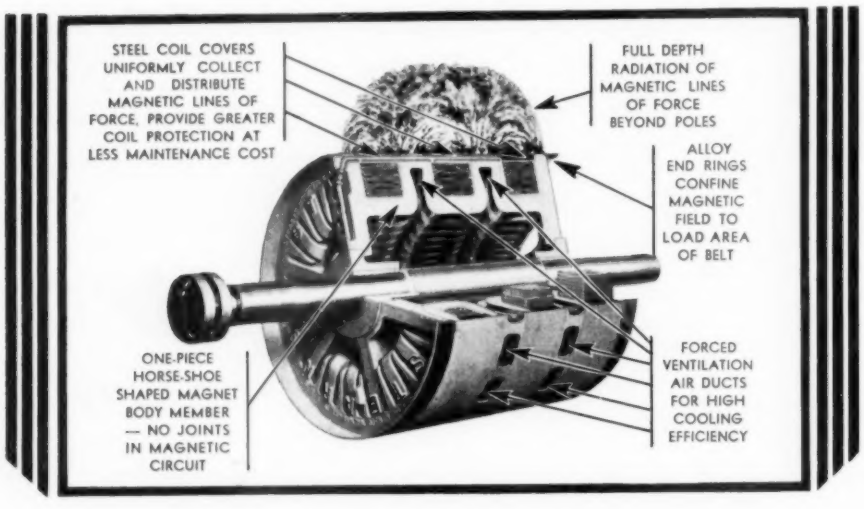
FOUNDRY COMMENT

IN ORDER to comply with the order of the War Production Board reducing the amount of paper used by magazines and newspapers, THE FOUNDRY begins with this issue the new wartime trim size of 8⅛ x 11¼ inches. By using a smaller sheet of paper and keeping the size of the type page the same, it is possible to save paper, thus conserving manpower needed to produce the paper and transport it from the mills, and at the same time continue to provide readers of this publication with the same amount of editorial material as before. In fact, by cutting away a little of the space between lines on the pages having three columns of type, it has been possible actually to increase the amount of editorial information published in this issue. Of course the saving in paper is made at the expense of the white margins around the page, but it is all in the cause of victory.

—□—

Difficulties encountered in combating and repairing damage from aerial attacks were outlined in a paper before the Institute of Mechanical Engineers. Recently the *Foundry Trade Journal*, London, presented the following editorial touching on the high points of the paper, and indicating some of the things foundrymen should know in providing blitz precautions. While American foundrymen thus far have been spared such attacks, the points outlined in this editorial should be studied by everyone as insurance against future contingencies:

Recently members of the Institution of Mechanical Engineers have been giving considerable thought to the subject of the proneness to damage of plant through enemy action, the discussion centering around a paper presented by Hal Gutteridge. This paper classified and gave proneness numbers to the various types of plant to be associated with a large engineering works. Such a study obviously provides an excellent basis for creating measures designed to give a maximum of protection against bombing. So far as foundries are concerned, the conditions vary so greatly that it is difficult to do more than enunciate generalizations. For instance, in one case a shop received three high explosive bombs, yet work was resumed after the delay of but one hour. Contributors to the discussion in question were unanimous that fire does more irreparable damage than does blast, and hence the necessity for proper and complete organization of fire guards. Moreover, the water used in extinguishing a fierce fire can do more damage than the actual conflagration. One case cited was that the damage done by fire amounted to $17,000 and by water $121,000, while in a second the figures were $500 and $17,000. In the average foundry the places most prone to damage are the drawing office, the patternshop and stores, and the despatch department, whereas the shops least prone are those devoted to fettling, coremaking and molding. Naturally, the more intense the mechanization, the greater the proneness to damage, cardinal points being the air compressors, the switchboard, electric motors and where they exist, the transformers. Just as in a large machine shop, one special duty machine tool needs special protection by means of blast walls, so, too, does any piece of plant, upon the continuous functioning of which the whole production of the foundry depends. A useful hint given in the discussion was that, in shops working day shift only, the overhead crane should be run up to the gable end of the building, for in this position it is not exposed to so great a risk as if left in the middle of the runway. The author, in his reply to the discussion, very rightly stressed the necessity for speed in reclaiming plant after


STEEL COIL COVERS UNIFORMLY COLLECT AND DISTRIBUTE MAGNETIC LINES OF FORCE, PROVIDE GREATER COIL PROTECTION AT LESS MAINTENANCE COST
FULL DEPTH RADIATION OF MAGNETIC LINES OF FORCE BEYOND POLES
ALLOY END RINGS CONFINE MAGNETIC FIELD TO LOAD AREA OF BELT
ONE-PIECE HORSE-SHOE SHAPED MAGNET BODY MEMBER — NO JOINTS IN MAGNETIC CIRCUIT
FORCED VENTILATION AIR DUCTS FOR HIGH COOLING EFFICIENCY

Stearns MAGNETIC PULLEYS

Progressive better engineering is back of every Stearns Magnetic Pulley—years of pioneering development and testing—hundreds and hundreds of satisfactory, profitable, trouble-free installations that make Stearns pulleys industries' choice.

Shown above are just a few of the many original and distinctive features that stamp Stearns Magnetic Pulleys the outstanding most for the dollar value today.

For efficient, economical, automatic separation, concentration, purification or reclamation there is a size to fit your needs, readily installed in your conveying system. Available also in self-contained mobile units.

It will pay you to investigate Stearns Magnetic separation methods.

WRITE FOR BULLETIN 302

STEARNS MAGNETIC MANUFACTURING CO.

662 S. 8th St. Milwaukee, Wis.

SEPARATORS—CLUTCHES—BRAKES—DRUMS—MAGNETS

damage by fire and water, because for many types of machines, especially electrical plant, deterioration sets in very rapidly, and unless attention is given reasonably quickly, they will become total casualties. The damage proneness number of any piece of plant becomes changed for the worse if the hazard be allowed to matter. This precept applies with great force to the patternshop, but through carelessness it can obtain in the foundry also. We do not suggest that it is incumbent upon foundry managers to classify their plant with the object of establishing proneness numbers, but we strongly advise that when on fire-guard duty, thought should be given to the subject and in some cases action should be taken to reduce the risk by the usual means.

—□—

A plant at Erie, Pa., adopted the following plan for curing absenteeism: "Each unexcused absence was publicized on departmental bulletin boards, another bulletin board in the plant entrance announced the up-to-minute standings of each department absenteeism; the union agreed to discuss this problem at their meetings; an award of lapel buttons was arranged for the department making the best showing at the end of a six month period." Reports indicate that the plan has been most successful.

—□—

Youngstown Alloy Castings Corp., Youngstown, had an interesting advertisement in the *Youngstown Vindicator* on Sunday, Feb. 14, entitled "Pouring the Heat on Hitler". In addition to plugging Trantinyl castings, the text charted the production of war bonds by employes during 1942. Congratulations on the advertisement.

—□—

A new department called "Washington Notes" appears on Page 196 of this issue. Each month THE FOUNDRY will present similar items of interest to the industry and will indicate changes and revisions in various government orders which in some way influence foundry production. The department is in charge of William G. Gude, new associate editor on THE FOUNDRY.

—□—

It didn't take the New Jersey foundrymen long to follow through with a good idea. Following an OPA definition on the subject of pleasure driving to the effect that "personal necessity driving shall be deemed to include . . . driving for the purpose of . . . attending meetings directly related to the occupation or profession of the owner or person using the vehicle . . ." the New Jersey Foundrymen's Association in issuing invitations to its meeting held in Newark, included a sticker which read, "This car is being used for attendance at a business session of the New Jersey Foundrymen's Association." To those having to use their cars to attend, it was suggested the sticker be affixed to the windshield when parking—so as to save an argument.

—□—

During the month I visited a large aluminum foundry producing cylinder heads for aircraft engines. One row of approximately 20 molding machines was being operated almost entirely by women and they appeared to be doing an excellent job. I was particularly impressed with the fact that after each mold had been made and the draw started, the women would grab shovels and clean up around the machine. Needless to say the molding floor was exceptionally clean.

—□—

Back in the early part of the century, there was a song that went something like "Meet me at St. Louie, Louie, Meet Me at the Fair." Nearly 40 years later someone should write a song about the War Production Foundry Congress that will be held on the banks of the old Mississippi in April.

And THE FOUNDRY gang will meet you in St. Louie.

F.G.S.

For MORE SPEED
in Snagging Steel Castings
.....with particular reference to
Swing Frame and
Stand Grinders
DAYTON GRINDING WHEELS
A Tough WHEEL
The snagging of steel castings calls for a tough wheel—a wheel that can do the job fast—at a low cost.
Many of America's most progressive steel and gray iron foundries find Dayton Correctly Bonded Grinding Wheels give their cleaning departments a new standard of efficiency.
DAYTON GRINDING WHEELS
SIMONDS WORDEN WHITE COMPANY
710 Negley Place • Dayton, Ohio

Co-operate in Study of Sand Properties

Six years ago, the executive committee of the Foundry Sand Research committee of the A.F.A. decided to do something about the foundrymen's perennial question, "What happens to sand in a mold when metal is poured against it?" Discussions at a meeting of that committee led to the formation of a Subcommittee on Physical Properties of Steel Foundry Sands at Elevated Temperatures under the chairmanship of D. L. Parker, General Electric Co., Everett, Mass. Steel foundry sands were chosen for investigation because such sands must withstand greater abuse due to the high pouring temperatures of steel, than other foundry sands. It was thought that information gleaned from such an investigation also would be applicable to other divisions of the castings industry because the effects are mostly those of degree.

Following appointment of the subcommittee, meetings were held and a program worked out to secure practical information which the foundryman could use immediately. Results of preliminary work showed that, in the long run, a program to determine the effect of the different variables known to exist in foundry sand would be of great value. As a result, that additional phase was added to the investigation and a new program worked out.

When the program of high temperature sand research was begun, the American Foundrymen's Association agreed to finance the program with the assistance of the steel foundrymen, and funds were raised to begin the project. H. L. York was employed to conduct the investigation at Cornell University, Ithaca, N. Y., under the direction of the subcommittee with Dr. H. Ries, technical director, Foundry Sand Research committee, as adviser. Later Mr. York resigned and J. R. Young was appointed in his place. Although some difficulties beset the work in the beginning, those finally were overcome and three progress reports thus far have been published.

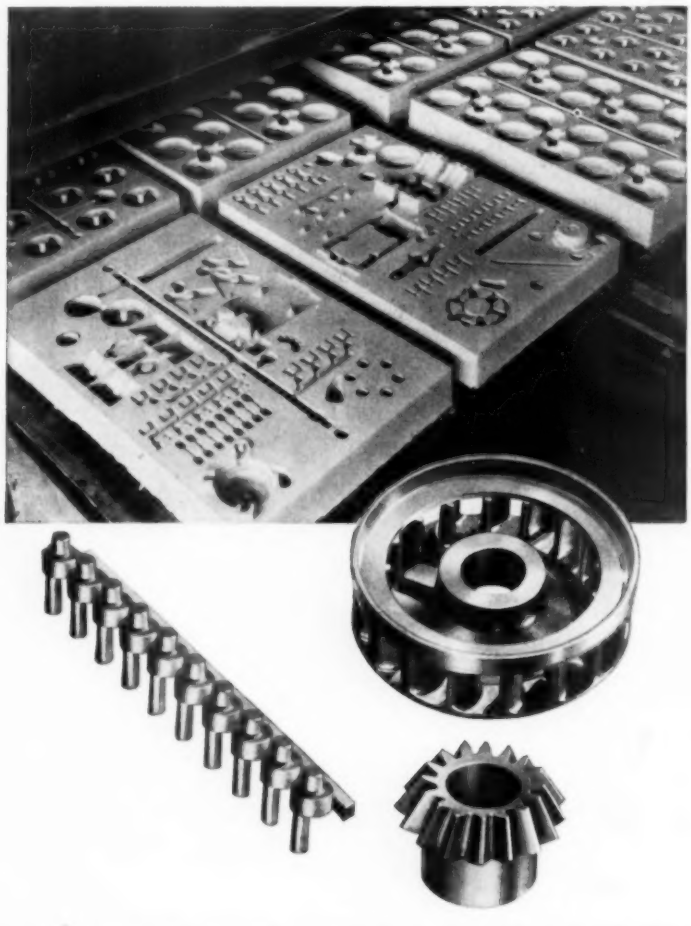
In reviewing the reports, few realize the amount of work that they represent. Literally thousands of tests must be performed to secure the desired information and all data must be checked thoroughly before publication. As a result, progress has not been as rapid as was desirable. That progress has been slow has been in no way the fault of the university or the personnel. It has been due primarily to apparatus difficulties and the large number of tests required. The apparatus problem has been solved but the large number of tests to establish proper "effect" curves still remained.

At a meeting of the subcommittee last year, it was suggested that the Naval Research Laboratory, Washington, be approached and asked to participate in the program. The committee appointed C. W. Briggs, Steel Founders' Society of America, Cleveland, to approach the Naval Research Laboratory and suggest its participation. Mr. Briggs visited the laboratory and found it receptive to the suggestion. After considerable correspondence, Chairman Parker is pleased to announce that the Naval Research Laboratory, of which Admiral A. H. Van Keuren is director and Commander R. W. Dole, assistant director, soon will begin full cooperation with the subcommittee and Cornell University in the project.

Work on the high temperature properties of steel foundry sands will be carried out at the Naval Research Laboratory under the direction of Howard F. Taylor and by R. E. Morey and Charles Clemons. It is expected that there soon will be an exchange of visits between the personnel of the two institutions, Cornell University and the Naval Research Laboratory, to lay a sound foundation for the cooperative work and to avoid duplication of effort in the program.

White Star Added To Army-Navy "E" Flag

A white star was added to the Army-Navy "E" pennant of Jenkins Bros. Inc., Bridgeport, Conn. at ceremonies held March 9. Admiral Wat. T. Cluverius, who made the initial presentation of the "E" last August, returned to renew the award.



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FOUNDRY PRODUCTS

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NATIONAL GYPSUM COMPANY, BUFFALO, NEW YORK

Obituary

FRANK J. LANAHAN, president, Fort Pitt Malleable Iron Co., Pittsburgh, died in that city March 2 after a long illness. Mr. Lanahan was born in Pittsburgh March 17, 1870, and for many

Frank J. Lanahan

years was prominently connected with the business, technical, educational and cultural activities of the city. His long list of business connections includes president, Davis Brake Beam Co., Johnstown, Pa., Fort Pitt Mine Equipment Co., Jeanette, Pa., director Warren Foundry & Pipe Co., Wharton, N. J., and board chairman, Auto Tite Joints Co., Pittsburgh. As an active member of the American Foundrymen's Association for many years he served on committees, as director, as vice president in 1932 and as president in 1933. He was a member of the American Iron & Steel Institute, Western Pennsylvania Engineers Society, American Society of Safety Engineers, American Society Municipal Engineers. During the World War period Mr. Lanahan was chairman of the malleable iron industry war service committee, and served as secretary or chairman of many other committees engaged in war work activities.

° ° °

Thomas W. Larkin, 82, president, LeRoy Plow Co. Inc., LeRoy, N. Y., died Feb. 7, at his home in LeRoy.

° ° °

Judson M. Stone, 43, vice president, Belle City Malleable Iron Co., Racine, Wis., died in Racine, Feb. 23.

° ° °

William E. Bee, 72, founder of the Palmer-Bee Co., Detroit, died in Detroit, Feb. 9. Mr. Bee at the age of 12 went to work with Detroit Spring Co., and later became superintendent of the plant, leaving in 1896 to become engineer for Gates Iron Works, Chicago. He later was engineer for Sheffield Car Works, Three Rivers, Mich.; chief engineer and superintendent of Webster Mfg. Co., Chicago; one of the organizers of the Stephens-Adamson Mfg. Co., Aurora, Ill., and engineer for Pittsburgh Shafting Co., Detroit. In 1905 he and two associates founded the Palmer-Bee Co. His son, George A. Bee, now is president and general manager of that organization.

° ° °

Max W. Babb, chairman of the board, Allis-Chalmers Mfg. Co., Milwaukee, died March 13 in that city. He joined the company in 1904 as attorney, was made vice president and general attorney in 1913, and was elected president in 1932, holding the latter post until Jan. 5, 1942, when he became chairman.

° ° °

William P. Yooss, 51, vice president, Federal-Huber Co., Chicago, died March 4 in Orlando, Fla.

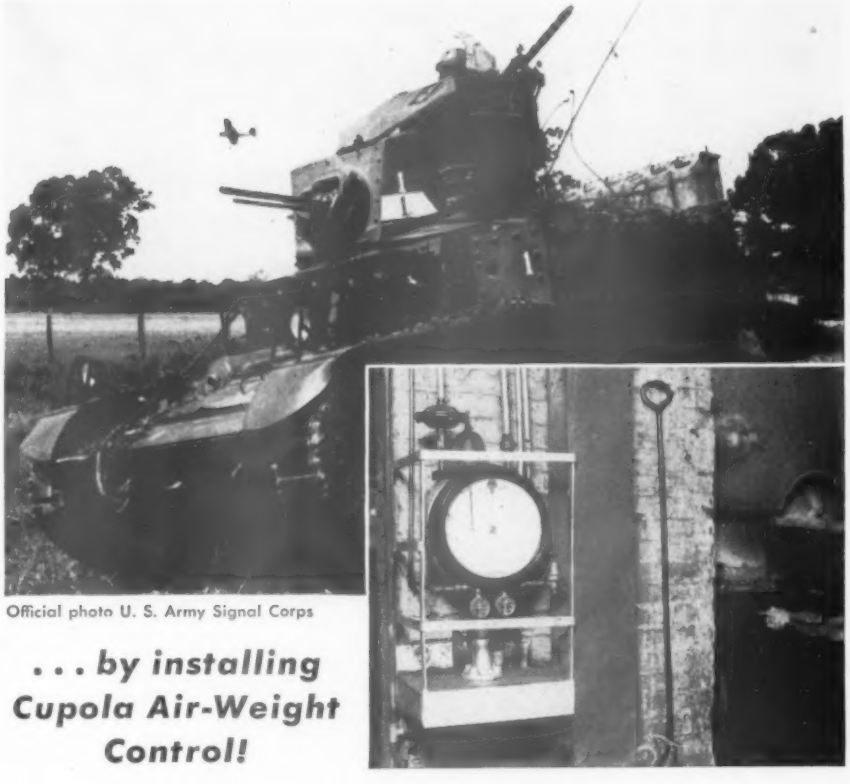
° ° °

Samuel Summers, 76, who retired as general manager, Buckeye Steel Casting Co., Columbus, O., 22 years ago, died at Columbus, Feb. 21.

° ° °

J. C. Fleming, 82, organizer and operator of the Moberly Foundry & Machine Shop, Moberly, Mo., died at his

An EXTRA Ton a Day for Tanks . . .



Official photo U. S. Army Signal Corps

. . . by installing Cupola Air-Weight Control!

Every added ton of good castings means another ton available for fighting equipment such as tanks. You can contribute ½ to 1 ton *daily*, by saving rejections with Foxboro Cupola Control!

Foxboro Air Weight Controllers control the blast by *weight* of air, instead of volume. They keep the heats uniformly hotter . . . give more perfect castings per tap. Eliminate pigging, save pouring time and fuel, too. And do it automatically, regardless of weather!

Write for complete Bulletin B-268. Names of nearby users on request. The Foxboro Company, 32 Neponset Ave., Foxboro, Mass., U. S. A. Branches in principal cities of the United States and Canada.

FOXBORO
REG. U. S. PAT. OFF.

AIR-WEIGHT CONTROLLERS

home in Moberly, Feb. 14. Mr. Fleming purchased the old Jacoby Foundry and organized the Moberly Foundry & Machine Shop in 1917 following the sale of coal mine properties the family had operated previously. He operated the foundry until his retirement in 1927.

° ° °

Joseph H. Harnischfeger, 64, member of the board of directors, Harnischfeger Corp., Milwaukee, for 31 years, died Feb. 17 in Milwaukee.

° ° °

Harry D. Barker, 52, Barker Foundry Supply Co., Los Angeles, died recently at his home. Mr. Barker was a native of Buffalo, and for many years was in the foundry supply business in St. Louis and Los Angeles. He was a member of the American Foundrymen's Association.

° ° °

Otto W. Lange, 72, president, National Sand Co., and vice president, Indiana Core Sand Co., Chicago, died in Chicago, Feb. 11, following a brief illness.

° ° °

John W. Montag, 89, founder and president, Montag Stove & Furnace Works, Portland, Ore., died at his home in Portland Feb. 15 following an illness of several months.

James G. Blunt, 74, assistant to the vice president in charge of engineering, American Locomotive Co., died in Schenectady, N. Y., Feb. 15.

° ° °

Joseph V. Wedgewood, for 15 years sales manager of the Neenah, Wis., plant, Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J., died in Neenah, March 6.

° ° °

Alexander Hutcheon, for a quarter of a century, foreman, Builders' Iron Foundry, Providence, R. I., died in Providence Feb. 22. Mr. Hutcheon was born in Glasgow, Scotland, but had lived in the United States 46 years.

° ° °

William A. Humphreys, 76, vice president, Robinson Clay Products Co., Akron, died at his home in Chicago, Feb. 22. Mr. Humphreys' affiliation with the company dated from 1894 when he became manager of its Chicago office.

° ° °

Elmer H. Van Schoick, 53, president, Chicago Retort & Fire Brick Co., Chicago, died at his home in Ottawa, Ill., March 13. He had been associated with the company since 1912 and its president since 1935.

° ° °

Arthur Aldrich Hale, 58, vice president, Griffin Wheel Co., Chicago, died of a heart attack, Feb. 21 at his winter home in Coral Gables, Fla. Mr. Hale had been with the company 37 years and had been vice president since 1927.

Chicago War Clinic Draws Foundrymen

Technical, manpower and management problems which have arisen to impede the war effort were discussed at a Chicago War Production Clinic conducted at the Medinah Club, Chicago, March 11. The meeting, arranged at the request of the WPB and sponsored by a group of 20 engineering and trade associations, the Army and the Navy, comprised 24 panel sessions and attracted an attendance of more than 2000.

Panel sessions, held simultaneously, were arranged under the general headings of machine shop practice, foundry, welding, metallurgy, inspection, nondestructive testing, plastics, protective coatings, communications equipment, and manufacturing personnel. Set up in advance with capable chairmen and qualified discussion leaders, these groups functioned in a manner which promoted lively and free discussion, and in many cases provided solution to current production problems.

Among the outstanding panels were four devoted to the foundry. One was concerned with "Production and Use of Aluminum and Magnesium Castings," another with "Cast Iron and Malleable Iron Castings," a third with "Brass and Bronze Castings," and a fourth with "Steel Castings." All of these attracted heavy attendances.

FRANKLIN

***Liquid Hide* GLUE**

SPEEDS

PATTERN-MAKING

It's ready to work when the work is ready. This modern glue is used as is . . . no mixing, heating or preparation. Hurried work to avoid chilling is eliminated, lessening the chance of mistakes.

Economical, too . . . no expensive glue pots or added use of electricity. Any Franklin Glue left over at the end of the day may be used the next day. It's tougher, does not dry hard or brittle and retains its tenacity. A foolproof glue the most inexperienced workman can use with top performance.

FREE SAMPLE

Test it in your own pattern shop and see if Franklin Glue doesn't give you better patterns faster.

"Every Drop Works"

THE FRANKLIN GLUE CO.

COLUMBUS, OHIO

A.F.A. AWARD RECIPIENTS NAMED

(*Continued from page* 127)

A.F.A. in 1933 for a 3-year term.

Mr. Harrington's activities have not been confined to A.F.A. He has written extensively for the technical press and is a member of the American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, American Society for Metals, Army Ordnance Association and War Products Advisory Committee. He is a past president of the New England Foundrymen's Association and a past chairman of the Boston chapter of the American Society for Metals.

CARL F. JOSEPH, a native of Cincinnati, later moved to Saginaw, Mich., and was graduated from the University of Michigan, Ann Arbor, Mich., in 1917 with a degree of bachelor of science in chemical engineering. He entered the foundry industry in his home town, joining the Saginaw Malleable Iron Co. After a year he became associated with the Bureau of Aircraft Production, Pittsburgh, and later served at McCook Field, Dayton, O., as research metallurgist.

In 1919, Mr. Joseph accepted a position with the General Motors Research Laboratories, Detroit, where he remained 3 years before being made chief metallurgist of Olds Motor Works, Lansing, Mich. He served in this capacity for only a short time, being transferred to his first foundry association, the Saginaw Malleable Iron Division of General Motors Corp., where he has acted as chief metallurgist since 1922. In addition to his association with A.F.A., Mr. Joseph is an active member of the American Society for Metals and the American Society for Testing Materials.

Mr. Joseph has taken an active part in A.F.A. work, serving on many committees of the malleable division. At present he is a member of the advisory committee and chairman of the program and papers committee of that division. He has presented numerous papers on subjects of interest to malleable iron foundrymen and is especially well known for his contributions in connection with the development of pearlitic malleable irons. He also has written two exchange papers for the association which were presented before European foundry groups, the first at the International Foundry Congress at Milan, Italy, in 1931, and the second in 1942, before the Institute of British Foundrymen.

STANLEY W. BRINSON'S first love was the Navy. He began his career at the Norfolk Navy Yard in 1906 as an electrical helper, resigning in 1909 to enter Virginia Polytechnic Institute from which he was graduated in 1913 in electrical engineering. Upon graduation he returned to the Norfolk Navy Yard where for a short time he taught mathematics in the apprentice school and later was transferred to the foundry to establish a laboratory.

In 1916, he was appointed assistant to the shop superintendent and placed in charge of the manufacture of gas engines and the foundry, being responsible for accounting, testing and manufacturing production. Since 1930, Mr. Brinson has been master molder, a rank equivalent to foundry superintendent in industry. He has been interested in work of the A.F.A. for many years and has been author or co-author of several papers on steel foundry practice. His papers are noted as monumental pieces of work, data for which in many instances have been accumulated over a period of several years.

Whiting Corp. Honors Old-time Employes

Old-time employes of Whiting Corp., Harvey, Ill., were honored at a recent meeting, when tribute was paid to the 422 persons who have been with the organization five years or more. Seventy individuals have service records of 25 years and over. The meeting was addressed by Howard D. Grant, president, and service pins and a portrait-photograph of John Hill Whiting, who founded Whiting Corp. 59 years ago, were presented to the employes with long service records.

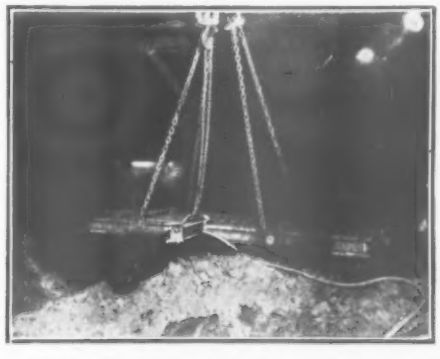
"BRANFORD"

VIBRATORS AND SPRAYERS

for speedy production of quality castings.

PATTERN PLATE VIBRATORS
HOPPER VIBRATORS
PATTERN DRAW AND RAPPING VIBRATORS
BLOW GUNS
MOLD CLEANERS & SPRAYERS
FLASK SHAKEOUT VIBRATORS
VIBRATORS FOR SHAKING OUT CORES

Accessories—Valves, Hose fittings, Automatic Oilers—Complete Vibrator fittings for Benches, Molding Machines and Tubs.



5" Flask Rapper shaking out copes 5' dia. to 10'6" x 20'0" x 12" deep.

SPECIALISTS FOR ALL PNEUMATIC VIBRATION REQUIREMENTS

Write to Dept. 5 for General Catalog

NEW HAVEN VIBRATOR CO.

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1915 BRANFORD VIBRATORS U.S.A.

Hopper Vibrators
Container Loading Vibrators
Annealing Pot Vibrators
Vibrator Tables

WOMEN AT WORK IN THE FOUNDRY

(*Concluded from page* 128)

excellent. More applications have been received than there have been jobs available.

Many women now working in the foundry originally applied for a foundry job. Bendix employs many women in its other manufacturing operations, but no attempt has been made to switch an applicant for a machine operator's job over to a foundry job. The foundry superintendent or the director of industrial relations discusses the job with each applicant. In this way each woman knows the work to be done. Women as well as men are hired for the shift and particular job they seek wherever possible. This eliminates much of the cause for possible dissatisfaction with the job later.

Rules on hiring and training are very flexible. Each applicant receives personal attention. Women who are physically strong, are preferred but selection is not on any preconceived rule. Only about 15 per cent of the applicants are hired. Because of careful selection, the chances of a woman liking her job and staying on it are increased greatly. In fact, only two women have left, and those preferred to be at home. Some of the women have grown families, others have growing families and others are single. There is no age group. Each woman (as each man, for that matter) receives a thorough physical examination including x-ray.

Some women get the "feel" of their job more quickly than others. On the average, women have been especially quick to learn the particular task assigned. In a number of cases women have learned enough about coremaking within a few days to warrant going on incentive pay. Training simply is a matter of the women watching their supervisors. In coremaking they watch a coremaker and then try themselves. It has not been necessary to set up a special school to teach the operators. Need for practically perfect work is impressed upon all those in the foundry. Women are quick to appreciate what would happen to an airplane with defective castings caused by poor coremaking.

Women are not absent from their jobs any more frequently than are men. In the Bendix foundry about 5 per cent of the force is absent for all causes. The accident rate is low, being one-half per cent.

It is not likely that women will be promoted to supervisors as most of them feel that they will return to private life after the war. Since the crews are mixed, the present system of having men as supervisors is satisfactory.

As more women come into all industry, factories may have the problem of caring for young children. So far, these matters are left up to the women themselves at Bendix.

The standard work week for women at the Bendix foundries is six days of eight hours each. Foundries are operated on three shifts daily.

So far, the employing of women in these foundries has not presented many more problems than are incurred in hiring unskilled men. In fact, the present program has been so successful that the percentage of women in the Bendix foundries will go up sharply during the next few months to offset the ever-increasing demands of the armed forces.

HAYNES

EQUIPMENT

WORM GEAR LADLES

Haynes Worm Gear Ladles are manufactured in all sizes. They are built to handle light or heavy production. Whatever your shop requirements are, you'll find a HAYNES Worm Gear Ladle available for every pouring need. Bowls are welded, and trunnions are cast steel with "V" bail. All gears are completely enclosed—and all moving parts are equipped with Zerk fittings. Bail is made from 3" x 1" steel. Send for detailed information and prices. In all cases, deliveries are promptly made.

HAYNES FOUNDRY EQUIPMENT CO.

1734 Lake Street—Kalamazoo, Mich.

MOLDING MACHINES — CORE OVENS — BRASS FURNACES

Becomes Division of Oven Firm

Stroman Furnace & Engineering Co., Franklin Park, Ill., has become a division of the Petersen Oven Co., with offices at 300 West Adams Street, Chicago, and plant at Franklin Park, Ill. The Stroman Furnace & Engineering Co., designs and builds crucible melting furnaces for magnesium, aluminum, brass, bronze and white metals, and also manufactures gas and oil burners and centrifugal blowers. The Petersen Oven Co., has been engaged in designing and fabricating bake ovens since 1879. Headquarters of the Stroman division are in charge of Jack L. Stroman.

ST. LOUIS FOUNDRY CONGRESS

(*Continued from page* 119)

tion Corp., Bendix, N. J., is chairman. Subjects to be covered include recommended practices for both aluminum and magnesium alloys, fluoroscopic examination of such castings, thermal gradients in cores for magnesium castings, and control of inhibitors in magnesium sands.

Outstanding in the program for gray iron foundrymen is the symposium on "Gray Iron as an Engineering Material," sponsored by the Gray Iron division of which Fred J. Walls, International Nickel Co. Inc., Detroit, is chairman. In addition to discussions of various engineering properties—such as endurance limit, dampening capacity, impact, modulus of elasticity, compression, torsion, tension, transverse strengths and deflection—such subjects as the relation between microstructure and properties, wear resistance and heat treatment will be thoroughly covered. High-spot of the symposium will be presentation of results of a survey conducted by the war metallurgy committee of the National Academy of Sciences, National Research Council, on the properties and applications of cast iron at temperatures above 450 degrees Fahr.

Program of the Brass and Bronze division, of which William Romanoff, H. Kramer & Co., Chicago, is chairman, includes presentation of several recommended practices dealing with copper-base alloys widely used for the production of war castings. These alloys include the manganese, aluminum and silicon bronzes. Of special interest will be the symposium on manganese bronze and a paper on the centrifugal casting of copper-base alloys.

Sessions of the Steel division, under the chairmanship of C. E. Sims, Battelle Memorial Institute, Columbus, O., will cover a wide variety of subjects. These include a paper on the results of using aluminum in 1000 steel heats, heat treatment of moderately heavy section medium-carbon steel castings, atmospheric pressure in blind risers, stress relief in steel castings, and factors which influence the ductility of cast steel.

Topics to be discussed by the Pattern-making division, of which Vaughan Reid, City Pattern Works, Detroit, is chairman, are numerous, ranging from job analysis and time study as applied to pattern-making to pattern coatings and insurance.

The general interest committees have planned sessions to be devoted to a variety of subjects of particular interest under wartime conditions. In addition to those previously mentioned, the Safety and Hygiene committee will present papers covering fire prevention and control in magnesium foundries, safety and hygiene problems in aluminum and magnesium foundries, and the engineering aspects of collecting dust and fumes in nonferrous foundries. Occupational disease problems also will be discussed at the session.

Materials conservation will be considered at the session sponsored by the Refractories committee. The Foundry Sand Research meeting will include papers on the elevated temperature properties of cores and coremaking materials, the use of southern bentonite in the steel foundry, and the causes of "burnt-in" sand conditions. Importance of foundry maintenance during wartime will be emphasized at a session sponsored by the Plant Equipment committee.

The annual A.F.A. dinner is scheduled for Friday evening at 7:00 o'clock, while the annual dinners of foundry instructors in engineering schools and of chapter officers and directors will be held Wednesday evening at 6:30 o'clock. Gov. Dwight Griswold of Nebraska is to be the principal speaker at the annual dinner. The subject of his address will be "Industry Fights a War."

W. W. Rose, executive vice president, Gray Iron Founders Society, will address the foundry instructors' dinner on the subject, "Education and the Gray Iron Foundry."

Registration for both men and women will be conducted at Hotel Jefferson.

Nobody did, Mister... *It's just that somebody forgot to specify Sturtevant engineering and apparatus...an installation like this, that insures adequate suction, better dust collecting, protection for men and equipment.*

IS PRODUCTION slowed down in your snagging, tumbling or sand-blasting operations due to inadequate dust control? Then get a Sturtevant System on the job! You'll get better working conditions for the men, a more efficient shop...with all the advantages of low power costs and minimum use of floor space.

Sturtevant's more than 80 years of air engineering experience is the answer! It means exclusive apparatus and system designs, expertly engineered to assure minimum power and space requirements...an installation that is performance-checked by a local Sturtevant Engineer, thoroughly familiar with foundry dust and fume problems.

Let us analyze the situation in your finishing department and show you exactly what can be accomplished...as we have for many outstanding plants.

B. F. STURTEVANT COMPANY, Hyde Park. Boston, Mass.

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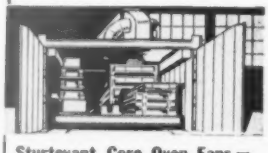
Puts Air to Work

OTHER STURTEVANT PRODUCTS *tailor-made* FOR YOUR INDUSTRY

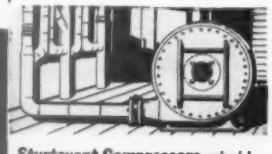
Sturtevant Cupola Blowers—assure smooth, constant pressure supply of air. Compact; simple, sturdy construction; sizes and types for all conditions.



Sturtevant Core Oven Fans—handle dirty dust-laden air with no loss in efficiency. Shafts cooled by special "heat-slinger."

Sturtevant Foundry Shake-out Systems—completely control dust and fumes, increase worker efficiency and equipment life, cut down maintenance.

Sturtevant Fume Control—efficient tailor-made systems for production foundries or low-operating-cost equipment for jobbing shops.



Sturtevant Compressors—hold air pressures constant, in supplying blast to oil or coke burners. Lifetime efficiency, minimum maintenance; worthwhile power savings.

Plant Safety and Foundry Manpower

(*Continued from page* 135)

among the least risky of occupations.

A cardinal principle in assuring a fine safety record is to make safety training an integral part of teaching a man his job. To do this foundry safety personnel is indispensable. It is interesting to note that recent sharp increases in the frequency and severity rates on injuries in steel and gray iron foundries are largely traceable to the small foundry units without thorough-going safety programs.

Between 1933 and 1941 the big foundries cut their frequency rates about 6 per cent, whereas in the same period, a National Safety Council analysis shows, the small foundry experience soared 24 per cent. With respect to severity, small foundry rates actually doubled, while rates in the large foundries decreased 29 per cent.

The conclusion is obvious. Safety pays off, and never more so in a time when management's greatest problem is to get the right men at the right place at the right time.

While safety supervision is indispensable, at the same time it has been my experience that—so far as on-the-job freedom from accident goes—if work is most efficiently performed, intrinsic hazard are minimized. When a man does his task well, it almost certainly follows that he does not get hurt. With the operation properly supervised and thoroughly understood by the employe, the labors of the safety personnel will be correspondingly reduced.

Foremen who, in their haste to meet schedules, cut corners at the risk of life and limb, must have their error made clear to them. There is definitely no percentage in this only too common practice these hectic times.

At the rock bottom, after management has done its best, safety in a steel foundry or anywhere else is very largely something chargeable to the individual worker. All the safety devices in the world will not thwart certain types. We know the kind of employe who, having goggles, inevitably forgets to put them on. He is religiously instructed to wear tight-fitting clothing, leg-guards, a protective cape and hard-toed shoes. Then he shows up with billowing overalls, wearing sneakers.

Such men are a menace to the gang with whom they work. They may be beyond redemption, but at least they can be segregated, or put to work where no amount of awkwardness has serious consequences. Such superlatively careless people, however, do highlight the fact that safety is a state of mind that must become "fashionable," an accepted form of society around the clock and not merely at work, in order to be permanently effective on a high level. It is exactly this goal which the Council and its Fund are trying to reach.

Supply Safeguards

At the same time it goes almost as a matter of course that management should supply every possible mechanical safeguard. Today safety is commonly built right into the machine. But with every bit of usable equipment in demand, even outmoded machinery, with plants abnormally crowded and the whole tempo of production drastically speeded up, it will be wise to make a brief accounting of some of our common hazards.

Handling materials is the main source of accidents in a foundry. Cut and crushed fingers, hands, toes and feet and strains are the most frequent type of injury. Good housekeeping, instruction, and such elementary safety devices as proper hand leathers, safety shoes with reinforced toe caps, wheelbarrows with knuckle guards and sidestakes on tramway or railroad cars to keep material from sliding off afford the primary answers. A gang safety leader can see to all these common-sense precautions.

Another not infrequent source of injury is crane operations. There is no ultimate safeguard against a man's getting his hands and fingers jammed between load and chain or pulley. Doing the job properly with competent supervision is the only answer. Loads borne by magnetic cranes, of course, should never be moved over the heads of workmen. Pieces dangling from the magnet jar loose at times, and a broken circuit lets the load crash

2-unit Shakeout 10′ x 12′. Capacity 35 tons

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down without the slightest warning.

The modern foundry takes for granted the provision of guards for the moving parts of wheel mills, mixers, sand cutters and sifters. A basic rule, almost ridiculously obvious but still flouted on occasion, is not to shovel sand out of mill when it is running. The men should never reach into any of these machines when they are in motion. Sand cutters throw sand and bits of metal with bullet-like force, and should be guarded. When sand sifters are equiped with electric vibrators the wiring ought to be carefully grounded to a water main.

Pneumatic vibrators occasionally are the source of grave accidents. If the portable sifter is limited in its movements only by the length of air hose, it is very likely that sooner or later the hose will be ripped apart, allowing sand to fly around with great danger to the eyes of everyone in the vicinity.

If core boxes and flasks are properly handled and piled, smashed fingers, crushed toes and ruptures will never happen. Cutting, straightening and bending gagger rods and core wires when done by careless workmen may result in eye injuries from flying bits of metal and dirt. Cores, needless to say, may topple over in making large molds unless the work is braced as it progresses.

Vent the Molds

Molds have to be properly vented, or an explosion may follow when the metal is poured. This is a mistake that a skilled workman would never make, perhaps, but the danger cannot be driven home too often . If the mold is rammed too hard, or the sand is too wet, the metal may boil over or explode just as if the mold were badly vented. Explosions also follow when gagers are rammed against the pattern and the sand between is pressed into a hard spot. Again, a good workman runs none of these risks.

It is absolutely essential, especially with plants so congested, to have clear gangways and aisles between the rows of molds. Cranes and overhead carrying equipment should not operate directly over the floor. Wetting down the floor calls for discretion. In cooling off the room and laying the dust care must be taken not to get water into molten metal, or to make wet spots that will not dry before the molten metal is carried over the floor.

Flask trunnions should have end flanges twice their diameter to minimize the danger of having the hooks slip off. When trunnions are bolted into place, the nuts should be on the inside of the flask to prevent the slings from catching on them so that the slings slip into place with a heavy jerk.

Spills and splashes of molten metal are generally responsible for the most serious injuries in foundries. Good housekeeping reduces the danger to a minimum. Clear passageways, level floors and plenty of elbow room are the obvious precautions. No green man should be allowed to carry or tilt ladles.

Men are often burned while cutting into the metal at the cupola. This can be prevented if, after they have filled their ladles at the stream of metal, they move sideways, instead of plunging forward toward their molds. Men carrying hot metal should pass each other on the bowl side, when going in opposite directions.

Yards must be kept in an orderly fashion, not only for reasons of safety, but because in these—or in any—times, space is valuable. Patterns represent a big investment, and should be stored in fireproof structures.

No horseplay should be tolerated with the air hose, nor should workers be allowed to clean their hair or clothing with such a powerful agent.

On the surface this listing stresses the obvious, but it is always neglect of the obvious that paves the way for tragedies we can ill afford in normal times, and must avoid at any cost these days of doubled responsibility. It might be a very good thing if, periodically, the safety personnel, or the management of those foundries with no rounded safety program, made a check list, or got one from the National Safety Council, to see for themselves how they are measuring up on accident-prevention.

The day of millenium in accident-prevention will come when safety becomes an issue off the job as well as on the job, when the idea of playing safe as a com-

quick acting

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• If certain phases of your foundry production seem to be lurking behind the "eight-ball", perhaps a small addition of No. 8 Mexican Graphite to your molten iron will change their pace . . . Grey iron castings that prove difficult to machine because of chill and hardness in the iron, usually revert to the foundry whence they came. . . . With the normal addition being less than two pounds per ton of iron, No. 8 Mexican Graphite (usually trickled into the stream of metal as it flows from the cupola spout) quickly produces a remarkable change in the physical characteristics of the iron. Hard iron becomes soft and chill reduction can be controlled to any desired depth. . . . No other ladle addition works so fast, so uniformly and so efficient as does No. 8 Mexican Graphite.

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munity obligation becomes fixed in everyone's mind. We can do our part during the working hours. We can likewise support the leaders of the national safety—the men identified with the National Safety Council and its War Production Fund—as they strive to make safety a living vital issue in the American consciousness.

Wartime Conservation, a 96-page booklet just published by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., contains recommendations for selecting, applying and using electrical equipment to achieve the best possible output with the greatest saving of critical materials.

A.S.T.M. Committees Review Progress

During the annual Spring Meeting and Committee Week, held by the American Society for Testing Materials at Hotel Statler, Buffalo, from March 1 to 4, a number of technical committees met and discussed progress in their work. The Section on Tension Testing of Committee E-1 on Methods of Testing reviewed its standard Methods of Testing of Metallic Materials (E8-42) covering apparatus, specimens and procedures, and from the ensuing discussion believes that no changes are necessary.

Committee A-10 on Iron-Chromium Nickel and Related Alloys announced preliminary results of some of the studies under way to secure data on the effect of rate of strain on mechanical properties of austenitic chromium-nickel-iron alloys, principally in the form of sheet and strip. The subcommittee responsible for classification of data, one phase of which resulted in the new publication giving chemical composition, physical and mechanical properties of wrought stainless steels, now is intensifying its work on similar data in the field of castings. In an effort to simplify specifications the subcommittee on castings is endeavoring to combine into one standard, requirements for austenitic nickel-chromium castings for high temperature service.

Pending actions on a number of aluminum casting alloys and in aluminum sheet and plate were covered by Committee B-7 on Light Metals and Alloys. The committee expects to bring composition limits in a number of casting specifications in line with present commercial practice and availability of materials. For the most part, those changes will affect alloys C2, copper-aluminum material; CS22, copper-silicon, and ZG41, zinc-magnesium-aluminum alloy. In connection with the required tensile tests on cast metals, a study is being undertaken to find a more suitable cast test bar pattern than is now in general use.

Six laboratories active in the work of the committee are co-operating in a series of tests to determine the performance of anodic coatings in the salt spray test as compared to their behavior under atmospheric exposure. It is hoped to have a preliminary report of the data for presentation at the annual meeting of the society in June. It was announced that there is a possibility some casting alloys may be included in the test work.

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Valve Manufacturer Wins "M" Pennant

Employes of the Jenkins Bros. Co., Bridgeport, Conn., were awarded the Maritime "M" pennant on March 2 in recognition of their splendid production of valves. Presentation of the pennant and the victory eagle flag was made by Charles E. Walsh, director of procurement, United States Maritime Commission. Bernard J. Lee, vice president in charge of manufacturing accepted the award on behalf of the workers.

Principal speakers at the ceremony included: Governor Raymond E. Baldwin of Connecticut; Mayor Jasper McLevy; Farnham Yardley, president of the company; Bill Dunn, war correspondent just returned from Australia; and DeWitt Mackenzie, war correspondent who acted as master of ceremonies.

Gardner Davis, distributor for Hill & Griffith Co., has moved from 16 Great Northern Freight Terminal to West 918 Mallon street, Spokane.

WISCONSIN HOLDS SIXTH CONFERENCE

(*Continued from page* 177)

Previous opposition to use of malleable iron for military purposes partly reflected confusion in the minds of government officials, according to K. H. Hamblin, recently with the War Production Board, Washington, and now supervisor of foundries, Grinnell Co., Providence, R. I. He declared that numerous additional applications of malleable to war equipment parts could be effected with satisfactory results; in fact, the industry would be unable to fill the demand if malleable castings were to be specified for all parts for which such material is suitable. Indicative of the extent to which malleable castings already are being applied, a survey of 38 producers showed 2500 separate parts were being furnished for war purposes by these companies alone.

Shock Resistance Sought

Both the Army and Navy are giving more attention to the subject of damage to equipment resulting from near-misses of projectiles. It has been found that a near-miss by a bomb may cause more damage to a ship than would a direct hit, not only because of what may happen to the ship's hull, but also because the shock may be sufficient to immobilize vital control equipment even though it is not immediately adjacent to the spot of the bomb's impact. Use of malleable iron for frames of electric motors on ships is being adopted to prevent the feet being sheared off as a result of such shock.

One symposium, sponsored by the Malleable Founders' Society with J. H. Lansing, plant practice engineer, presiding, included a paper by Dr. Enrique Touceda in which effects of various factors on fluidity of malleable iron were discussed. Because of these influencing factors, it was stated that use of the test mold offers a better guide to fluidity than temperature alone, although temperature has by far the greatest single influence on the fluidity of molten metal.

Dr. Touceda pointed out that a thin shell or pipe of solidified metal forms quickly in the spiral test mold, thereby preventing the subsequent flow of metal from coming in contact with the sand or facing, and creating instead a shearing action. Surface tension may cause pinholes in the casting by reducing the wetting power of the molten metal. Mold washes improve this wetting power. At the same time, facing material acts to withdraw heat from the molten metal and speed the initial solidification. If anything, this tends to reduce the flow.

Opinion varies on the effect of grain size and type on fluidity. In the case of cast steel, venting of the mold is said to have little influence on the rate of metal flow. Variations in mold temperature affect fluidity, but moisture has little or no effect in amounts up to 6.2 per cent. Above this figure, however, fluidity drops. Permeability is a minor factor unless the range is higher than necessary. Dr. Touceda expressed preference for the thermocouple over the optical pyrometer for measuring temperatures, because of the personal element entering into use of the latter. Subsequent discussion indicated that few foundries represented were regularly pouring spiral test bars.

A symposium on patternmaking had G. F. Smitka, Ampco Metal Inc., Milwaukee, as its chairman. Problems incident to pattern design for new types of castings required in war production were discussed by A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, and H. J. Wade, Fairbanks, Morse & Co., Beloit.

The latter pointed to the desirability of simplifying patterns and cores as much as possible to facilitate their handling by less skilled workers. He also suggested that the patternmaker work with the foundry in selecting locations for gates and risers, and with the aid of pattern models assist the engineering department in visualizing design for simplified coring and proper molding.

Mr. Wade demonstrated a wooden frame of his design which fits over roll-over patterns to protect the latter when

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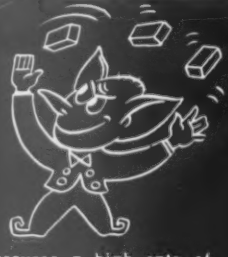

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not in use. These frames permit the patterns to be stacked compactly according to pin centers. Symbols are stamped on the sides to permit ready identification of the patterns when stacked.

During the 2-day meeting foundrymen interested in steel castings attended five interesting sessions on feeding of castings, centrifugal casting, converter steel, effect of boron, and control of high-temperature properties of cores. The first session held Thursday afternoon was devoted to a discussion of "A New Development in Feeding Steel Castings." Speaker was H. D. Phillips, Lebanon Steel Foundry, Lebanon, Pa., and Fred Pritzlaff, Falk Corp., Milwaukee, presided.

Mr. Phillips described a method of feeding steel castings developed in his firm's foundry. It depends upon relieving the vacuum formed in risers on steel castings so that atmospheric pressure will assist in forcing the molten metal in the risers into the castings to feed shrinkage. The method uses a graphite rod inserted into the riser and was developed in 1931 with co-operation of the National Carbon Co.

The riser is carried above the top of the casting and employs a flow-off. Due to that, ferrostatic pressure as well as atmospheric pressure is used to insure feeding. Mr. Phillips cited the following advantages for the procedure: Hotter metal in the riser; better temperature gradient throughout the casting; cleaner castings lower cleaning costs; sound castings, and improved yield. Contact point between riser and casting is 1½ times the thickness of metal at point of contact. Sizes of graphite rods used are as follows: Up to and including a 6-inch diameter riser ¼-inch rod; 6 to 10-inch riser, ⅜-inch rod, and above 10-inch riser, ½-inch rod. When using the method of gating a larger flask is required, but it need not be so deep. Use of a graphite rod as compared to a sand rod produces a flat type of shrink in the riser. Diameter of riser employed is 2½ to 3 times the section of the casting. Mr. Phillips mentioned that for several years the yield on pressure castings in his foundry has been 55 per cent.

Weigh The Metal

Second steel session was under the direction of C. F. Haertel, Falk Corp., and Nathan Janco, Centrifugal Casting Machine Co. Tulsa, Okla., spoke on "Spinning Steel." He described the three general methods for casting metals centrifugally which include the true centrifugal process for cylindrical castings such as pipes or tubes made without a core. The spinning axis may be vertical or horizontal or between those two. Size of the hole and thickness of metal is controlled by weighing accurately the amount of metal poured into the machine. Cylinders made by the vertical method always are tapered on the inside, and the amount of taper can be calculated by the empirical formula

$$N = 264\sqrt{\frac{1}{R_1 - R_2}} \times \sqrt{H}$$

where N is the revolutions per minute; R_1 is inside radius, top; R_2 is inside radius, bottom, and H is height of the casting.

Second method known as the semi-centrifugal process is applicable to production of gear blanks, sprockets, sheave wheels, flywheels, etc., usually in dry sand molds. The metal is poured at the center of rotation and the center gate acts as a riser. Third is the pressure method, more commonly known as centrifuging. Various sizes and shapes of castings may be arranged in a mold around the center of rotation with a central downgate and side gates to the individual castings.

During the discussion of the paper it was brought out that castings weighing as much as 3500 pounds were being made centrifugally. When using the semi-centrifugal method it is desirable to start pouring at a low speed, perhaps 5 revolutions per minute to get proper distribution of the metal, and avoid a scoring or cutting action. After the mold is filled the speed is increased to the desired point. Maximum peripheral speed is 1000 feet per minute, and centrifugal force is 50 to 100 times that of ferrostatic pressure. On castings such as gears and pressure castings where the yield normally is 40 to 50 per cent, it is possible to increase that to 75 to 80 per cent. Centrifugal casting sometimes results in increased mold-

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ing costs, but cleaning and metal costs are reduced.

Third steel session was held Friday morning under the direction of James J. Ewens, Milwaukee Steel Foundry Co. Subject of the meeting was "Converter Steel and the Triplex Method for Producing Steel for Castings," and A. W. Gregg, Whiting Corp., Harvey, Ill., was the speaker. He reviewed briefly the history of the converter in this country, and mentioned the revival of interest in the process during the past two years. Quality of converter steel, according to Mr. Gregg, has been shown to be equal to that produced by other processes as indicated by the work of Sims and Dahle, and reported at the A.S.T.M. meeting held in June, 1942. Advantages of the converter method include quality steel at high temperatures; flexibility; ability to desulphurize (and in some cases dephosphorize); low demand charge; continuous supply of steel when used in connection with electric furnaces, and ease of training operators.

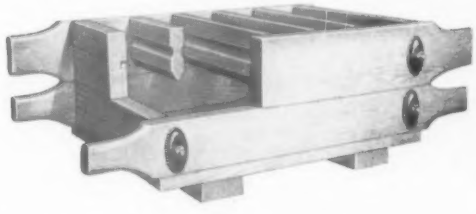
Discuss Triplex Process

One of the disadvantages of the converter method lies in the larger blowing loss as compared to other processes. However, Mr. Gregg said that loss was not as serious as would appear at first glance. The sideblow converter normally has a blowing loss from 10 to 15 per cent, and a large portion of that loss is represented by loss of 3 to 3¼ per cent carbon, 1½ to 2¼ per cent silicon, and ½ to ¾ per cent manganese. Sum total of those amounts to about 6 per cent, and should be deducted from the total blowing loss to determine loss by oxidation of iron. Mr. Gregg discussed the triplex process in some detail. The metal charge is melted in a cupola, blown in a converter, finished in ladle, and then delivered to an electric furnace which acts as a heated distributing ladle. Operation of the electric furnace is said to be inexpensive when used in that manner. In addition to his talk Mr. Gregg showed a motion picture depicting two large cupolas in operation to supply hot metal for part of the charge in large open-hearth furnaces.

Effect of boron on steel and its machinability was the topic of the fourth steel session held Friday. David Zuege, Sivyer Steel Casting Co. was chairman and Norman F. Tisdale, Molybdenum Corp. of America, Pittsburgh, was the speaker. According to Mr. Tisdale boron is used in steel to increase hardenability and to make possible the use of lower alloy additions. It is added as a late addition, and if the steel is deoxidized properly an 85 per cent recovery is possible. Amount added is small, and for best results should not exceed 0.003 per cent. Boron exists in steel as a complicated boron-iron carbide with the formula $Fe_3B \cdot Fe_3C$. It increases hardenability by retarding the rate of transformation. According to the speaker addition of 0.003 per cent boron has an effect about equal to 1 per cent nickel; 0.30 per cent chromium; 0.12 to 0.14 molybdenum; 0.05 per cent vanadium, or 0.40 per cent manganese.

Addition of boron is useless unless the steel is to be liquid quenched and drawn. Its best application is in fine-grain steels. Boron has no adverse effect on weldability. In fact some welding rod now is being made containing 0.005 per cent boron which when deposited has a content of 0.001 per cent boron. If a boron bearing steel has a brinell hardness over 225 the machinability is better as compared to other steels of the same hardness. There is a small improvement in machinability in steels having a brinell hardness less than 225.

Final steel session on Friday afternoon was under the direction of Paul C. Power, Maynard Electric Steel Castings Co., and Fred B. Riggan, Key Co., East St. Louis, Ill., discussed high temperature physical properties of cores for steel castings. He pointed out that there is a difference of opinion on just what is meant by the terms refractoriness, fusion, sintering point, fluxing, vitrefication, temperature glazing, welding, etc. when applied to sand mixtures. The degree of refractoriness of a material generally is defined as a measure of its ability to withstand heat. However, Mr. Riggan thought that it might be proper to broaden the definition to include conditions under which the material withstands



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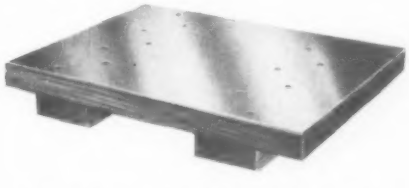

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heat, or to find other terms to express the ability of sand to withstand heat under conditions of reducing or oxidizing atmosphere, sudden or gradually applied heat, heavy or light stress, acid or basic slag forming tendency, and other conditions such as metal turbulence and surface tension.

He mentioned the use of iron oxide to improve hot strength of cores, and that its use was quite beneficial. In one case trouble was encountered with what was believed to be a scab. However, the sand was strong and scabbing usually is attributed to weak sand. Investigation proved the trouble to be a severe buckle, and addition of iron oxide gave enough plastic strength to prevent disintegration of the core surface. He said that in casting sections of one to two inches that while the mold surface might reach 2700 degrees Fahr., the highest measured temperature ¼-inch back from the metal-sand interface is 1700 degrees Fahr. The sand ¼-inch back does reach maximum expansion, and whether or not that maximum expansion permits that layer of sand stay in position may have a great deal to do with the high temperature problem. Therefore, if a correlation could be made between the time-weight factor and temperature, and the influence on expansion characteristics of the sand ¼-inch back of the interface, worthwhile information could be secured for future reference.

Mr. Riggan said that in investigation of sands used he found that a total overall expansion reduction from 0.029-inch to 0.025-inch in 2 inches could be obtained by addition of 2 per cent wood flour to the regular weak core mix. It also reduced collapsing time from 6¼ to 5¾ minutes under a 4 ounce load. However, since a 2 per cent wood flour addition would mean one-fifth of the total volume of sand, that was not put into practice. He also said that addition of 2 pounds of bentonite to a regular core mixture of 1000 pounds will raise hot strength about 1½ pounds at 2500 degrees on weak cores of around 3 pounds hot strength. That is about as effective pound for pound as silica flour on the mixture. Larger additions of bentonite would change the green strength properties to such an extent that further comparison of hot strength would be useless.

Stand High Pressure

The nonferrous group held a series of five sessions devoted to a wide range of topics. The first meeting was held Thursday afternoon with Walter Edens, Ampco Metal Inc., Milwaukee, as chairman and A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee as vice-chairman. Harold J. Roast, Canadian Bronze Co. Ltd., Montreal, was the speaker and he discussed silicon bronze with particular reference to the production of a gun cradle casting weighing about 500 pounds. The casting contained two pressure chambers of which one had to withstand 4000 pounds and the other 60 pounds per square inch hydrostatic pressure. Five risers were used to insure feeding, and the casting was poured through a horn gate entering into a large rectangular riser at one end of the casting which was molded horizontally in dry sand. The riser was located on an extension of the casting so that the whole could be sawed off easily. Gate and riser weight equalled that of the casting.

Mr. Roast pointed out that by observing certain precautions little difficulty should be encountered in the production of silicon bronze castings. The green sand molds must not contain over 6 per cent moisture, and where practicable, dry sand molds are to be preferred. Each type of casting has an optimum pouring temperature which can be found by experiment, but it should be kept in mind that the best metal will be obtained when the temperature at the arrival point in any given part of the mold is as close to 1900 degrees Fahr. as possible. Each heat of metal should be controlled by a test bar of the keel block type, and the bar should not be less than 1¼ inches square where it joins the feeding block. The block is made in dry sand and requires about 40 pounds of metal. Fracture of the bar must be uniform and of the color, in the case of P.M.G., of a dry, freshly broken chocolate bar, free from any brassy, yellow spots or areas.

Risers must be adequate for silicon bronze, and they should receive hot metal

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either by pouring directly into them or filling with hot metal as soon as the metal has reached the level of the actual casting. Lack of feeding is indicated by fractures showing brassy colored areas. Mr. Roast stressed the importance of the deep etching test particularly where pressure or corrosion resistance work is involved. Solution used is composed of two parts nitric and one part hydrochloric acids. Sample may be saw cut or ground on a rough wheel and it is boiled for 10 minutes. Attack of the acid must be uniform without any evidence of preferential or intercrystalline attack. In closing Mr. Roast mentioned that investigation indicated that silicon bronze might serve satisfactorily in high-speed, heavy pressure, fine tolerance bearings. He also called attention to the new antimony bronze, stating that it showed signs of being useful in certain circumstances. Its greatest drawback is lack of sufficient elongation.

Determine Pouring Temperature

In the discussion which followed a question was asked on the proper pouring temperature for thin castings to withstand 70 to 80 pounds per square inch pressure, and Mr. Roast said he believed that it should be between 2150 and 2200 degrees Fahr. Another question referred to the cause of formation of a whitish powder on silicon bronze castings. The reply was that it was lead silicate, and that will appear if the alloy contains over 0.5 per cent lead. While it is preferable to use non-lead bearing silicon bronze for pressure work, less trouble will be encountered when small amounts of lead are present if the silicon is held on the low side.

With ordinary care silicon bronze may be melted without absorbing gases, but occasionally that does take place. Mr. Roast stated that he had tried strongly oxidizing and reducing atmospheres without any trouble, and assumed that the gassing resulted from some critical condition which would have to be determined by careful investigation. Relative to gating, he said it was a mistake to follow regulation red brass or bronze practice. The procedure to follow was about half way between that for manganese bronze and tin bronze. For applications of silicon bronze where highly nonmagnetic conditions are desirable the iron content should be under 0.25 per cent, or manganese substituted for the usual iron content.

Second session on nonferrous practice was held on Thursday under the direction of L. J. Andres, Lawran Foundry Co., Milwaukee, as chairman. William George, R. Lavin & Sons, Chicago, was the speaker and his topic was manganese bronze. Essentially he discussed the revised recommended practice for sand cast manganese bronze which will be presented in full at the annual convention of the A.F.A. to be held in St. Louis on April 28, 29 and 30. That pointed out that comparatively wide limits in sand grain size are permissible since the aluminum oxide film on the surface of the molten bronze gives a fair finish even in coarse sand. However, the moisture content should be held to 5 to 6 per cent. Manganese bronze is a high shrinkage alloy and tends to form dross when agitated. Hence, risers should be of adequate size to insure feeding, and gating should be designed to prevent turbulence and agitation.

High strength of the alloy permits use of strong cores without developing strains in the casting. Silica sand with a good grade of core oil generally is used. A graphite coating on cores often is used to permit easy removal. To prevent local shrinkage chills frequently are imbedded in the cores. In melting accurate temperature control is advisable to hold zinc loss to minimum and promote uniformity of product.

In reply to an inquiry on the flaring temperature of manganese bronze Mr. George said that it depended on the composition of the manganese bronze, and was around 1925 degrees Fahr. He pointed out that in many cases it was not necessary to flare the bronze, and pouring could be done at 1750 to 1800 degrees Fahr. Trouble with flaring is the copious zinc fumes generated, and from a health standpoint, it is advisable to suppress as much as possible that condition. In answer to a question on the shape of the horn gate relative to the casting,

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Mr. George pointed out that the choke at the bottom of the sprue should be a little smaller than where the gate enters the casting, and that will provide a smooth flow.

Nonferrous sessions held Friday Feb. 19 were devoted to salvage of bronze castings, scrap clinic, and sand control. The first on "Salvage of Bronze Castings" was held at 9 o'clock with Chairman John Wiltzius, Nordberg Mfg. Co., Milwaukee, presiding, and Harold E. Bailie, of the same firm as speaker. He said that the three main welding procedures used are the electric arc, carbon arc, and oxy-acetylene, and that some bronzes lend themselves for welding by one and not by the others. Since copper is the base of a large number of alloys with a wide range of properties, Mr. Bailie divided them into seven groups with similar welding characteristics. Those included copper, copper-zinc, copper-tin, copper-silicon, copper-nickel, copper-aluminum, and copper-beryllium alloys. In the copper group cuprous oxide has a weakening effect which is overcome through the use of deoxidizers in the welding rod. While that decreases electrical and thermal conductivity, tensile strength and ductility are increased, so that welds equal in strength and ductility of the parent metal can be made.

The copper-zinc group or brasses lend themselves best to the oxyacetylene process of welding, and the operation best is accomplished using a minimum temperature with an oxidizing flame to form an oxide crust or using a film forming element in the weld rod. The carbon arc process can be used with a zinc-free rod. In general the best filler rod is tobin bronze which is a high zinc brass containing a small amount of tin. The copper-tin alloys or tin bronzes are not difficult to weld, and may be handled with either the oxyacetylene or arc welding process. With gas welding a rod low in phosphorus is preferable while for arc welding a rod containing 0.10 to 0.20 per cent phosphorus is used. Copper-silicon alloys may be welded with any of the three processes, and during the operation a liquid silica-glass film forms which protects the metal from the torch and oxidation.

Rapid Welding Desirable

In welding copper-nickel alloys which are sensitive to carburizing, oxidizing and sulphurizing effects, the operation is conducted as fast and continuous as possible. Special rods available facilitate welding. Copper-aluminum alloys or aluminum bronzes are welded satisfactorily by the carbon-arc process, and the same is true for copper-beryllium alloys. First requirement in welding is to clean out the defect down to sound metal, otherwise a good bond will not be secured. Usually it is advisable to lay as much metal per bead or layer as possible. Peening the weld should be performed to upset porosity. Since it is not always possible to obtain welding rods which match the color of the parent metal, attention should be devoted solely to securing a sound weld.

Second nonferrous session held on Friday was a scrap clinic on nonferrous defects under the direction of A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee. The discussion centered around the "Report of the Nonferrous Division Committee on Analysis of Defects in Nonferrous Castings." Final nonferrous session was held Friday afternoon with Harry W. Dietert, Harry W. Dietert Co., Detroit, as the speaker, and Paul W. Bergmann, Ampco Metal Inc., Milwaukee, as chairman. The subject of Mr. Dietert's talk was cores and he pointed out that hot tears were due to a slow rate of collapsibility. That trouble may be overcome by use of cereal, reduction of clay or silica flour if present, and use of coarser sand. While some may object to use of coarse sand due to the rough surface left on the casting, that may be eliminated by coating the core with dry red talc or graphite which is rubbed on and fills the small interstices.

The Philadelphia office of Debevoise-Anderson Co. Inc., has been moved from the Stephen-Girard building, to room 2206, Girard Trust Co. building, South Penn Square. The company had been located at the former address for 24 years, the move being necessitated by government agencies taking over office space in the building.

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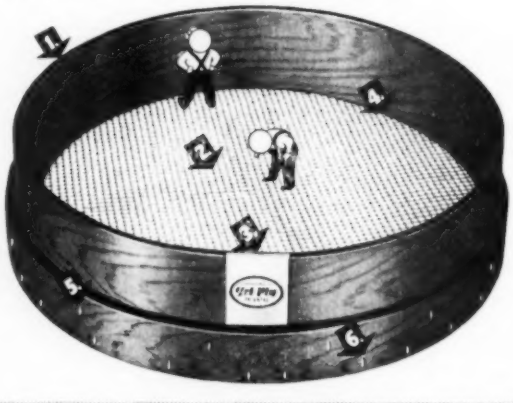

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CASTS STEEL CENTRIFUGALLY

(*Continued from page* 134)

will not "pick up" readily without slipping or "raining." Excessively high spinning speeds will tend to cause longitudinal hot tears in the casting by reason of the circumferential tension developed by the centrifugal force as the casting freezes and begins to shrink away from the mold wall.

In metal mold centrifugal casting, spinning speeds somewhat lower than the calculated may be used since the chilling effect of the mold causes the metal to "pick up" more readily than in the refractory sand mold. For very thick castings, the initial spinning speed is often slightly increased above the calculated speed in order to quickly "pick up the larger volume of metal. For castings, such as flanged castings, where the maximum outside diameter is very much greater than the minimum inside diameter, the diameter on which to base the spinning speed calculation may be a compromise so as to have sufficient centrifugal force on the inside diameter and yet not excessive force on the maximum outside diameter.

Pipe Cast Centrifugally

In the steel foundry of the American Cast Iron Pipe Co. Birmingham, Ala., a variety of steel castings are produced by centrifugal methods both in sand-lined and in metal molds. While steel casting at the plant began in 1940, centrifugal casting of gray cast iron pressure pipe has been in production practice since 1922. As much as 15 thousand tons of centrifugal castings per month has been the usual output for the past several years. The steel foundry is served by five acid lined electric arc furnaces, one of 6,000-pound capacity, two 4,000-pound capacity, one 2,000-pound capacity, and a 500-pound furnace used largely for experimental purposes. On a six-day, two-shift basis this foundry is capable of producing 1500 tons per month of salable product.

In the operation of the furnaces, preliminary carbon samples are run in Leitz Carbon Meters, two instruments serving the five furnaces. Finished heats are tapped into tea-pot ladles which serve as holding ladles and for pouring into the individual casting ladles. In analysis of final samples from each heat carbon, sulphur, and phosphorus are determined in the chemical laboratory while silicon, manganese and alloys are quantitatively determined by spectrographic analysis. In the spectrographic laboratory analysis for five elements is carried out in 20 minutes from the pouring of the sample with an accuracy of plus or minus 2 per cent.

Figures 1, 2, 3, 9, 13 and 16 show some of the castings regularly produced by the horizontal centrifugal method and Table I gives the salient casting data.

Bogie wheel hub castings, cylinder barrel castings and other relatively short length cylindrical steel parts are cast at Acipco in metal molds spinning about the horizontal axis. The engine cylinder castings are usually made of S.A.E. 4140 steel or some modification. They are normalized and tempered for softening, and then rough bored at the foundry to permit the essential inspection of the interior surface. Final machining, hardening of the bore, and finish grinding or honing are carried out by the engine manufacturers.

A furnace heat of about 4,000 pounds is tapped from the furnace into the holding ladle at about 3200 degrees Fahr. This tea-pot ladle is transferred by the electric overhead traveling crane to a traveling floor crane which serves as the pouring and weighing car. This car moves back and forth on a track in front of the battery of centrifugal casting machines shown in Fig. 8.

There are 18 spinning machines having 4 casting heads each making a total of 72 horizontal casting heads. Each metal mold is attached to a face plate mounted on a shaft. There is a mold at each end of each shaft, with two shafts,

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or four casting heads, driven by one variable speed motor. A ring shaped metal stop-off plate is keyed into the open end of each metal mold.

A dial scale is mounted on the pouring car and the metal poured into each hand ladle is carefully weighed to the pound as shown in Fig. 7. The pourers move the hand ladles suspended from an overhead trolley to the spinners and pour the entire contents through an orifice pouring trough into the spinning mold assembly as depicted in Figs. 4 and 10. Three 4-head machines compose one unit with six heads on each side. The two pourers alternate at the pouring car and each pours six heads on one side of a unit before the car and pourers move on to the next unit. One unit of 3 machines with twelve heads is poured in about 3 minutes. The stripping and mold cleaning crew follow the pourers. The machines are shut down as soon as possible after casting, the stop-off plate removed, and the solidified casting immediately withdrawn as indicated in Fig. 11. The molds are cleaned, loose particles blown out and the molds faced and then reassembled as shown in Fig. 14.

By the time all 72 molds have been cast the pouring car is returned to the first casting unit which is by that time ready to be re-cast. As of the present date over 100,000 of these castings have been shipped to the fabricators.

Cylindrical shafts and tubing in lengths up to 16 feet are made centrifugally at the American Cast Iron Pipe Co. in horizontal sand-lined molds. The molding equipment and spinning machines used for this casting are those used for the production of Mono-Cast centrifugal cast iron pipe in 16-foot lengths. In ramming a mold, the metal flask is placed in a vertical position on a metal stool which closes the lower-end of the flask and centers the metal pattern inside the flask. The diameter of the metal pattern is the outside diameter of the finished shaft plus a shrinkage allowance and tolerance for finish in machining. Tempered synthetic sand is fed continuously from a cylindrical hopper into the upper end of the flask and hand guided pneumatic rammers pack the sand tightly between the pattern and the flask as shown in Fig. 13. When the ramming of the 16 foot long cylindrical mold is complete, the flange part of the mold is rammed at the top and the pattern withdrawn upward.

The dimensions of the metal flask are such that the sand lining is always within limits of 1½ to 2 inches thick. The rammed mold is faced with a silica flour wash then dried with gas.

End Closed With Core

The mold is placed in the centrifugal casting machine, and the flange end closed with a flat core of baked oil sand on a metal plate keyed into the open end of the flask. The plain end of the mold is similarly closed with a ring shaped core with a hole at the center of the axis for introducing the metal. In the casting machine the flask is driven by two sets of separately powered friction rollers operating on roller bands near each end of the metal flask.

The molten steel from the electric furnace is conveyed to the weighing and pouring station by electric locomotive. The exact weight of metal to produce one casting is poured into an open top pouring ladle, at the weighing station as shown in Fig. 12. The flask-mold combination is brought up to the proper spinning speed, about 1100 revolutions per minute, and the metal is introduced by pouring from the ladle into a refractory trough terminating in a refractory orifice extended through the ring core stop-off into the mold as depicted in Fig. 6. After slow cooling in the mold the castings are stripped, cleaned and inspected.

Tubes from 4 to 36 inches in diameter and from ½ to 4 inches in thickness, 16 feet long, have been cast in sand-lined molds by this method, and equipment is available to go up to outside diameters of 50 inches.

The physical properties of centrifugally cast steel have proved to be quite satisfactory. Some centrifugal jobs have been made at the American Cast Iron Pipe Co. where the specifications required tensile and bend tests to be cut from the casting itself. Tests for the ship shaft

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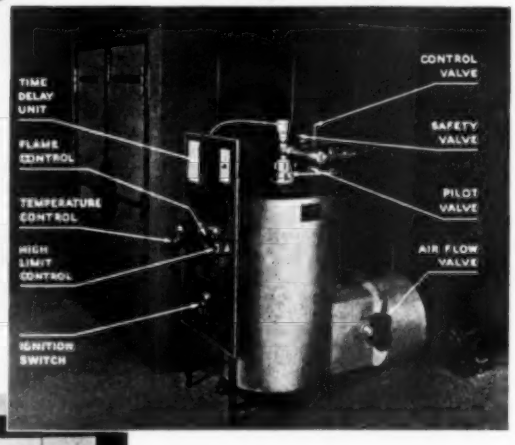

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castings shown in Table I were made on specimens in this manner and proved to be entirely satisfactory.

The steel is a 0.30 per cent carbon steel with silicon and manganese somewhat higher than normal. Standard specimens cut from the 2½ inch thick shaft are required to meet the following physicals:

T. S.	90,000 p.s.i. Max.
Y. P.	40,000 p.s.i. Min.
Elong.	20% Min.
R. A.	30% Min.
Bend Test	120 degrees

For horizontal centrifugal casting in metal molds the required tests on bogie wheel hubs (line 1—Table I) were made on bars cut from the castings. These were made of S.A.E. 1030 steel normalized and tempered and easily passed the following minimum requirements.

T.S.	65,000 p.s.i.
Y. P.	35,000 p.s.i.
Elong.	20%
R. A.	35%
Std. 0.505" diam. Tensile bar	
Bend Test	90 degrees
1 x ½" bend bar	

For shapes adaptable to this method, horizontal centrifugal casting is an economical and efficient method for mass production of sound homogenous steel castings.

Metals Advisory Group Named

Members of the minerals and metals advisory committee and the mineral resources operating committee recently have been appointed. Membership of the advisory committee, which is composed of representatives of 12 governmental agencies, includes: War department, Herbert G. Moulton, consultant, Resources and Production Division; Navy Department, Lieut. Commander E. H. Augustus, chief, materials branch Office of Procurement and Materiel; Board of Economic Warfare, Dr. Alan Bateman, chief, Metals and Minerals Division, Office of Imports; Reconstruction Finance Corp., DeWitt Smith, vice president, Metals Reserve Co.; Bureau of Mines, Dr. R. S. Dean, assistant director; Geological Survey, Donnel F. Hewett, geologist in charge, Section of Metalliferous Deposits; Bureau of Foreign and Domestic Commerce, Walter Janssen, chief, Metal and Minerals Unit; Office of Civilian Supply, WPB, Stanley Adams, director, Metals and Minerals Division; Office of Production Research and Development, WPB, Dr. C. K. Leith, chief, Metals and Minerals Branch; Facilities Bureau, WPB, Fred Searls, director; Labor Production Division, WPB, Wendell Lund, director; Stockpiling and Transportation Division, WPB, Dr. W. Y. Elliott, director. Function of the committees is to consider broad general programs for increasing the supply of minerals and metals.

Membership of the operating committee comprises Dr. Bateman, Mr. Smith, Dr. Dean and Dr. Harvey N. Davis, director, Office of Production Research and Development.

Book Review

Transactions of The American Foundrymen's Association, cloth; 1322 pages 6 x 9 inches; published by the American Foundrymen's Association, 222 West Adams Street, Chicago.

Growing larger year by year as the activities of the association expand, the present volume, No. 50, as may be noted from the number of pages, is the largest to date. It contains a record of the proceedings at the forty sixth annual meeting of the association, held in Cleveland April 20 to 24, 1942. In addition to the president's annual address, summary of proceedings of the 46th annual meeting, reports of officers, financial statement and minutes of board meetings, the volume presents in permanent form the 75 papers on the agenda with a record of the discussion which followed their presentation. An index at the back covers the subject matter by the titles of the papers and also by the names of authors. The book is available to members for $4.00 and nonmembers at $15.

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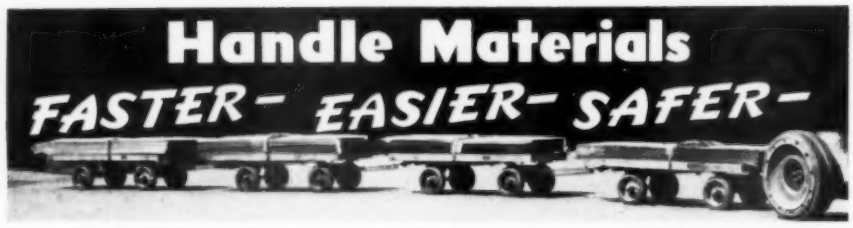

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PACKARD CONVERTS TO ALUMINUM

(*Continued from page* 138)

successful. Increasing numbers of women workers will have to be put on the job as time goes on.

Ultimately Packard expects to have a battery of 19 melting furnaces, each of 1000-pound capacity, to supply metal requirements. About two-thirds of these are now installed and are being operated intermittently. Two types of melting pots are being tried in these furnaces, one a cast iron design, which is coated of course before use, the other a silicon carbide composition.

Only one alloy is melted for casting requirements, a standard type of sand casting alloy and used by other foundries supplying Rolls-Royce castings. A large proportion of the pig metal used is secondary aluminum, although a certain amount of virgin is used depending upon allocations and availability. Furthermore since there is such a large proportion of scrap encountered in the form of gates and risers, a considerable proportion of remelt metal is charged along with new metal.

Pouring Device Automatic

To handle the remelt, a 30,000-pound reverberatory furnace has been installed, flanked by a closed conveyor mounting 175 pig molds. This conveyor passes by the side tapping hole of the furnace and by regulating the flow of metal from the furnace into a special type of automatic pouring device, an operator can fill each mold to exactly the same level as it passes by the pouring cylinder. This pouring device was developed by B. A. Dollens, general superintendent, nonferrous foundries, Delco-Remy Division, General Motors Corp., Anderson, Ind. After perfecting the device Mr. Dollens made it available to a number of other companies producing aluminum castings.

Close attention must be paid to fluxing the aluminum alloy melt before it is ready for pouring, this operation requiring a minimum of 40 minutes time for each 1000-pound heat. Two principal reasons for fluxing are to remove aluminum oxides from the bath and to remove gas from the molten metal which causes pinholes in castings. Various types of fluxes are used, with varying degrees of success. Aluminum oxide has nearly the same specific gravity as the metal itself, so oxides in the bath do not rise readily to the surface. Standard practice in removing hydrogen is to bubble chlorine gas through the metal in the reverberatory or remelt furnace; solid fluxes are used in the melting pots.

Departing from what appears to be standard practice in many aluminum sand casting plants, Packard is using a sand with permeability of 30 and moisture content around 4.5 per cent, contrasting

with conventional permeability of 10 and moisture 9 per cent. It is felt that the higher permeability gives much sounder castings, although admittedly they are a little rougher on the surface. However, surface roughness can be corrected to a certain extent with mold washes and furthermore since aircraft engine castings are finished all over to almost a mirror polish, the matter of as-cast roughness is not so serious.

There are about 30 cast aluminum parts for the Rolls-Royce, weighing up to 87 pounds each, which Packard plans to produce. This does not include all the castings going into the engine, but it represents the "tougher" ones and the ones most critical from the standpoint of supply.

Five separate pouring conveyors, all formerly used in the iron foundry, now are being used to handle various sizes of aluminum castings. These are supplemented by stationary pouring stations, giving a fairly complete flexibility to the layout. Largest of the conveyors is that on which supercharger housings are poured, and on which cylinder blocks soon will be poured.

Conventional types of shakeouts, with grid bars of iron or steel, are not suitable for shaking out aluminum castings, since impact of the casting with these bars would nick the casting. Hence shakeouts are covered with parallel timbers laid over the usual metal grid and the castings tumbled out onto them, sand falling down onto a conveyor in the usual manner.

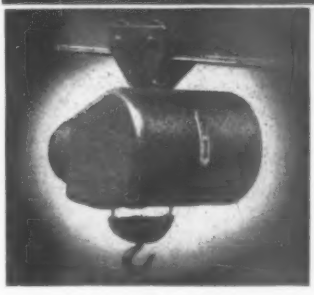
Castings Moved on Conveyors

Cleaning, inspection, testing and heat treatment of castings are carried out in a separate building near the foundry, with a conveyor to move parts from one building to the other. After gates and risers are either sawed off or drilled out, the castings proceed through various shotblast treatments and bench operations. All pieces are given a special pressure test in which they are blocked up in fixtures so that air pressure can be applied to the inside of the casting and it will be airtight except for possible defects in the surface. Soapy water is sprayed over the outside and bubbles quickly reveal any imperfections. Castings with such imperfections are not necessarily rejected, since it is permissible to peen over small holes or fissures in some cases. A second corrective is to soak the defective casting in hot water and then in a solution of sodium silicate which penetrates and seals defects while under pressure in autoclaves.

All castings are given a single heat treatment, five hours at 550 degrees Fahr. in a continuous oven which was assembled from units formerly used in the lacquer-drying process in the manufacture of automobiles.

Not the least of the headaches involved in converting this large iron foundry to aluminum was the matter of personnel. Long before the conversion was effected, most workmen had left for other jobs in the Packard plant, so that only a bare nucleus was left to begin the aluminum

CONCO HANDLING EQUIPMENT



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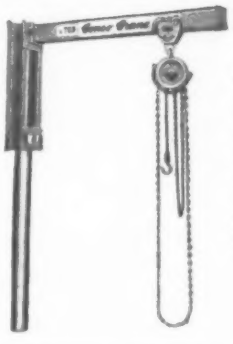

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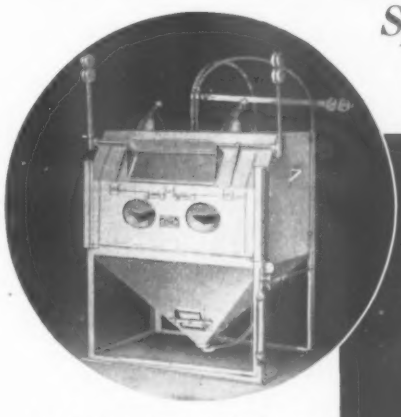

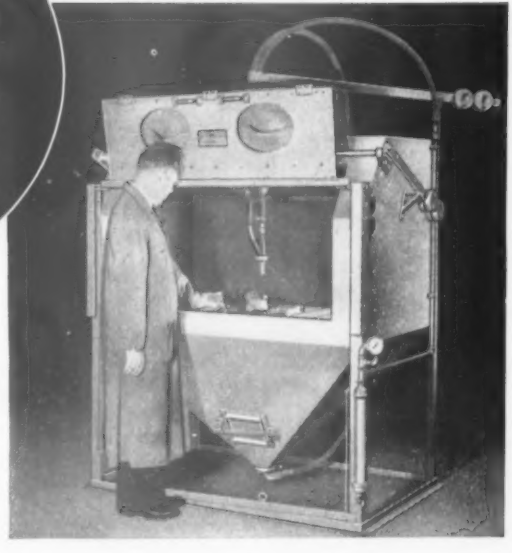

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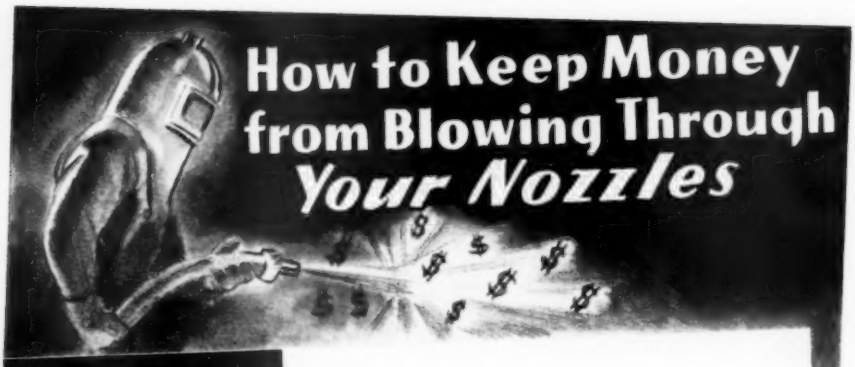

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casting operations, and even these men were unfamiliar with the methods and equipment.

Scores of completely "green" men and women were hired and painstakingly trained for skilled work. Naturally their first efforts met with difficulties, but by dint of trying and trying again they were taught some semblance of correct methods and procedure. This training was particularly difficult in jobs like assembling and setting cores for large castings, which require accurate positioning of cores.

A complete new laboratory is being built and equipped with all necessary devices and equipment, including a spectrograph, for testing and research on aluminum. X-ray equipment is about all that is lacking, but this equipment is available in the main laboratory when needed.

A complete and permanent log of every melt of metal on the Rolls-Royce and the Packard marine motor is kept from the time castings are poured until the completed motor is shipped. Melt numbers are given to each 1000-pound pot of aluminum. The castings are identified by placing narrow aluminum tags in the molten risers after pouring. After shaking out and before chipping these numbers are stamped on a conveniently located pad on each casting.

After cleaning and rough inspection the castings are sent to a final inspection department where they are held until the laboratory issues are O.K. for chemical and physical properties of the test bars. All castings are then stamped with a serial number. Every casting has a pattern number, melt number, serial number and a heat treat stamp.

On the assembly line, a complete record of each part of every motor is kept so that during the life of the motor reference may be made to any of its various parts.

Adventures of Bill

(*Concluded from page* 156)

60 inches, melting about 15 tons per hour? On jobs ranging from 1500 to 3500 pounds he would need a foundry about 80 x 300 feet and a crew of over 100 men including 35 molders, half a dozen apprentices, a dozen or more coremakers and about 50 general laborers and handymen for a daily 25 to 30 ton heat. I admitted that the offer of a big job is very tempting, but unless all the factors are favorable, and unless the foundryman has enough knowledge, experience, confidence and horse sense to swing it, he will be well advised to pass it up."

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CORES FOR MAGNESIUM CASTINGS

(*Continued from page* 141)

The property of high shrinkage of magnesium has still another, less direct effect on the required properties of magnesium cores. Due to this shrinkage, many chills must be used to equalize the cooling rates between the thin and heavy sections of the casting. These chills are usually made of cast iron and may weigh several pounds. Unless the green strength of the core sand is high enough, the unbaked core will be unable to support the weight of the heavy chills.

Metal Heat Is Low

Heat content of molten magnesium, especially when considered on a volume basis, is much less than that of the other common foundry metals as indicated in Table I. Even though the pouring temperature may be 1500 degrees Fahr. the actual number of heat units in the metal is seldom sufficient to burn out the binder from the core. Tests conducted by our laboratory have shown in many thin-walled castings the temperature of the core, ⅛-inch back from the metal may never exceed 500 degrees Fahr. This surprising fact can be understood readily by considering the following example:

Assume that three cubes of metal of identical size, 10 centimeters on a side (or roughly about 4 inches) are to be poured. One of these cubes is to be poured of iron at 2800 degrees Fahr., the second with aluminum at 1400 degrees Fahr., and the third with magnesium at 1500 degrees Fahr. Making use of the figures in Table I we can calculate the total number of calories of heat each of these cubes will give off while cooling down to room temperature. This calculation will show that the iron cube will give off approximately 2,420,000 calories, and the aluminum cube approximately 752,000 calories, but the magnesium will give off only 492,000 calories. In other words, the magnesium gives off less heat even than aluminum to burn up the core, *even though the aluminum was poured* 100 *degrees Fahr. colder than the magnesium.*

Obviously, if a core only reaches 500 degrees Fahr. in the mold after pouring, we cannot expect ordinary core binders which require baking at 400 to 450 degrees Fahr. to disintegrate at 500 degrees Fahr. in the poured casting. Therefore, special provisions must be made to facilitate core knock out and permit casting shrinkage.

To combat the difficulty in removing internal cores from magnesium castings, some foundries have gone to the extent of re-routing some castings through the cleaning process in such a way that the core is not shaken out

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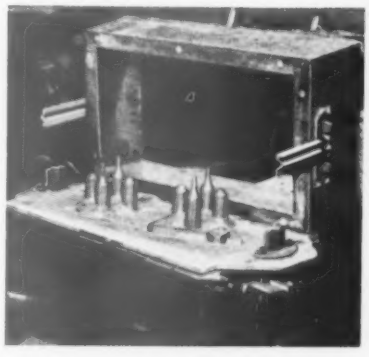

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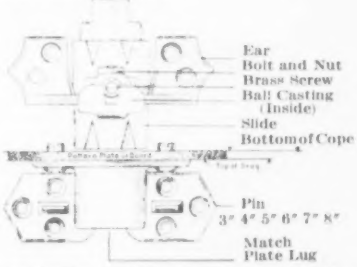

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until after the casting is heat treated The long period of time at the temperature of the heat treat furnace is sufficient to burn out the binder and allow the core to disintegrate. However that re-routing of castings presents certain disadvantages, and the recent trend has been toward the use of a high pressure jet of water to wash out the cores This has proved quite efficient, especially in jacket type cores which are surrounded almost completely by metal

The low heat content of magnesium has one advantage, in the fact that sintering or burning of the sand will not take place as it often does in the manufacture of steel castings. This permits reclamation of magnesium core sand for reuse. Although the Ford Motor Co. does not practice this procedure of reclaiming magnesium core sand for reuse in cores, other magnesium foundries, especially those using all dry sand for molds, are making provisions for such equipment. Instead of using old core sand in cores, we use it mixed with a high pressure stream of water in hydroblasting castings to give a uniform surface after the core is removed by the water stream.

Cannot Use Chaplets

The low heat content of magnesium does not permit the use of chaplets for supporting cores, as the chaplets will not fuse with the finished casting and a thin oxide film prevents the joining of molten magnesium with the cold chaplet. Although cadmium and low melting alloys have been suggested for this purpose, they have never proves very satisfactory because, no matter what the melting point of the chaplet, any slight variation in the pouring temperature of the casting will either leave the chaplet unfused or melt it, dropping the core. This occurs because the heat capacity of the chaplet is greater than that of the molten magnesium surrounding it.

The property of lightness of magnesium is perhaps the most famous and the major reason for its wide use today. Dry strength of a core, naturally, does not have to be as great to support the lighter weight of molten magnesium as it would be for iron or steel. Furthermore, the tendency of the core to float on the metal is not as great.

Because of this lightness, however, any slight pressure on the surface of the molten metal due to excess gas in the core will cause blow holes to form in the casting. Consequently, the permeability of the core must be great enough to permit free escape of the gases, the core must be baked thoroughly, and the core sand must be as low in gas-forming ingredients as is safely permissible.

Next to the property of lightness, chemical reactivity is perhaps the most notorious of the peculiarities of magnesium. As a matter of fact some of the notoriety it has obtained because of this property has been quite unfounded. For example, *Time* magazine in the July 6, 1942, issue on page 63

made the statement that "This most inflammable metal" is so dangerous that "exposed magnesium parts of planes are coated with a secret, fire-resistant paint" to keep it from igniting. Obviously, in this case, the chemical reactivity of magnesium was grossly exaggerated.

Although magnesium *is* a chemically active metal and has a great affinity for oxygen when in the molten condition, in the massive state, as in a casting, this chemical reactivity affects magnesium only in its tendency toward rapid corrosion. However, that can be controlled considerably by proper surface treatment of the finished part. Molten magnesium, on the other hand, burns merely by contact with air, and will even take oxygen out of chemical combination, such as from water. If hot enough to start the reactions, molten magnesium will even reduce oxides such as CO_2, SO_2, Fe_2O_3,SiO_2, and give off considerable heat during the process. It is the chemical reduction of SiO_2, silica, and of water with which we primarily are concerned now.

Magnesium sand cores, unless sufficiently and properly protected by oxidation inhibitors, may react with molten magnesium. If no inhibitors are used and any moisture has been absorbed by the core, an explosion is almost certain to result when magnesium metal is poured into the mold. When there is insufficient protective agent in an overheated core, a condition known as *sand attack* may occur. This is usually characterized by a dark, grainy discoloration near the surface in the fractured section of the casting as shown in Fig. 2. In extreme cases entire molds or parts of castings may be consumed when magnesium reacts with the silica in the mold. *Sand attack* must not be confused with *sintering* or *burning-in* of the sand as previously discussed. Sintering refers to the actual fusing of the sand or clay bond which usually occurs at temperatures of perhaps 2300 degrees Fahr. or more. Sand attack, refers to an actual chemical action of sand with molten magnesium where the sand does not necessarily fuse.

The most commonly used oxidation inhibitors for magnesium are sulphur and boric acid, and ½ to 1 per cent of each mixed with the core sand often is sufficient for thin-walled sections where there is no excessive flow of metal to overheat the core surface.

For heavy walled castings or thin sections through which considerable metal must flow, thereby heating up the core face, further precautions must be taken to protect the core from the chemical action of the metal. For large castings, many foundries fill the mold with sulphur dioxide gas from a tank before pouring, to eliminate as much air as possible from the mold and furnish an inert atmosphere. This is common practice especially where the mold is composed primarily of dry sand. For the average medium-sized green sand mold with dry sand cores, sufficient protective sulphur dioxide is generated

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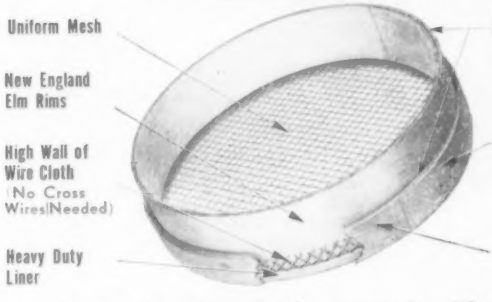
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by the heat from the metal volatilizing the sulphur in the green sand, and a cloud of protective vapor is pushed through the mold ahead of the metal.

Sometimes additional protection is obtained by painting parts of cores with a suspension of sulphur in alcohol. This practice, however, is not very common as too heavy a coating of sulphur left on the core may cause blows in the casting due to excessive gas being evolved.

In many larger castings, although those precautions may protect the magnesium from air in the mold, the dry sand core face may be heated excessively, usually by a large amount of metal flowing past an isolated spot, which results in sand attack. That condition can be prevented by the use of volatile fluorides and fluosilicates which, upon heating, liberate hydrofluoric acid, inert to magnesium. The hydrofluoric acid liberated not only furnishes an inert atmosphere but apparently enters into a reaction with the overheated silica and any water present and prevents them from attacking the molten magnesium, possibly according to the following reactions shown in *Analytical Chemistry* by Treadwell and Hall, 1931:

$$2\ H_2F_2 + SiO_2 \longrightarrow 2\ H_2O + SiF_4$$
$$3\ SiF_4 + 4\ H_2O \longrightarrow H_4SiO_4 + 2\ H_2SiF_6$$
$$SiF_4 + 4\ H_2O \longrightarrow H_4SiO_4 + 2\ H_2F_2$$

or:

$$(NH_4)_2SiF_6 + 4H_2O \longrightarrow 2NH_4F + Si(OH)_4 + 4HF$$

These compounds may be applied as a water spray on the hot core immediately as it comes out of the oven, and the water will evaporate without further necessity for reheating the core. Many foundries prefer to return the core to the oven for 30 to 60 minutes after the spray, but we have not found this necessary if the core is hot enough when sprayed. A water solution of Dow Agent No. 12 has proven ideal for this type of spray.

Spray the Core Surface

Cores protected by fluoride sprays are useful for still another reason. Since sulphur has a melting point of 234 degrees Fahr., even when present in small amounts in the sand mixture, it will tend to melt during the baking of the core and fuse in the core, causing it to harden. One-half per cent is the minimum safe amount to which the sulphur content in the core sand can be reduced, but even this amount is excessive when an exceptionally weak core is required. Consequently, we have found that for such cores, protective agents may be left out of the sand entirely, if the outer surface of the core is sprayed thoroughly with the protective fluoride spray. This practice has permitted cores to be made as weak as necessary. As a matter of fact, after pouring, some bottle type castings need only several raps with a hammer to loosen the core sufficiently to permit blowing out the disintegrated core sand with an air hose. The exact sand mixtures used for this core will be described later.

Since volatile protective agents are necessary to combat the chemical reactivity of magnesium, a large volume of various gases will be liberated in the core and in the mold when it is poured, even if the binder used does not form gases. Consequently, sand used for magnesium cores should have as high a permeability as possible, and a large number of vents should be used.

Since practically all magnesium castings being manufactured today must meet the rigid dimensional requirements for aircraft parts, it is exceptionally important that the cores used to make these castings maintain these rigid standards. This means that the surface of the cores must have a hard crust which will permit handling without crumbling or spalling . An ideal magnesium core, then, must embody not only this hard crust, but must also be weak enough internally to permit the necessary easy collapse.

For maintaining the dimensional accuracy, rubbing fixtures, pasting fixtures, and gages are very necessary for magnesium cores. Very often such a gage or fixture will clear up many difficulties, and repay the original cost of the gage many time by greatly decreasing the number of foundry rejects. Driers are used extensively to prevent warp or sag during baking.

Core prints and locator cores especially, must have a hard, non-crumbling surface to decrease the possibility of core shifts. Since this part of the core never forms an internal part of the casting, it can be made as hard as necessary without adversely affecting the casting.

Now that we have considered what properties are necessary for magnesium cores, let us review the materials from which we must select and mix together ingredients which will enable us to achieve these properties.

Since permeability to gases is of utmost importance in magnesium cores, the sand selected must have as uniform a grain size as possible with a high base permeability. Round grained washed silica and sharp grained sands may both be used, but each has a specific application. For easy collapse, the round grains, since they have the least contact area, offer less resistance; but if high strength is necessary to maintain dimensions and prevent warp or sag, especially before baking, the interlocking effect of the sharp angular or subangular grains are better suited as pointed out in *Modern Core Practices and Theory* by Dietert, pages 5 and 100. Also, as is well known, the larger the grains of the sand, the less the contact area, and the more easily the core will collapse.

Natural sands with a high percentage of clay are to be avoided for magnesium cores, as considerable water is necessary for working, and the clay may tend to absorb moisture after baking. This chemical water in the clay which is not driven off during baking still offers a potential hazard to molten magnesium. Furthermore, the fact that core sands eventually contaminate the molding

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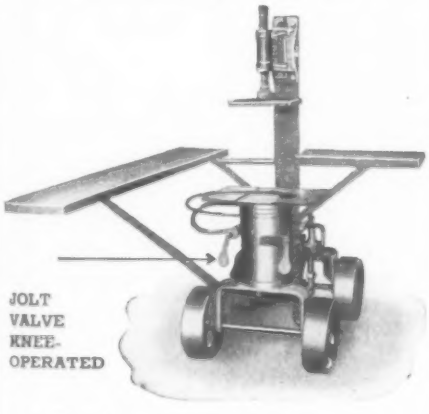

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heap makes it more advisable to use a sand low in natural clay content. Natural sands have been used to some extent by some foundries here and in Europe. However, in this country the trend is more and more toward synthetic quartz type sands free from clay as indicated in *Technology of Magnesium and its Alloys*, by A. Beck. Naturally bonded sands, since they contain a certain amount of silt in addition to bonding clay, require more oil because of the greater surface area of the small particles. This results in lower permeability and less collapsibility.

For best control of mixtures, sand should be delivered to the core mullers as dry as possible. However, drying often presents the problem in that the sand in bulk retains its heat long after drying and requires varying amounts of water to cool it down to the point where it will absorb water for tempering. This difficulty best can be overcome by providing sand storage bins sufficiently large so that the sand will cool before it is used.

Table II lists the properties of the two sands used in Ford Magnesium Foundry cores.

This is the first of a series of two articles from a paper presented by the authors at the Jan. 21, 1943 meeting of the Detroit Chapter of the American Foundrymen's Association. The second will appear in an early issue.
THE EDITORS.

Book Review

Breaking The Skilled Labor Bottleneck, by Eugene J. Benge; fabricoid, 47 pages 8 x 10 inches; published by the National Foremen's Institute, Deep River, Conn. Price $2.00.

This book is the result of a survey undertaken to study labor shortage. The study brought to light many ways in which labor shortage may be avoided or overcome. Subdivision of skill, coupled with intensive training was the most promising method of achieving immediate results. The present manual covers the subject under two headings: The nature of skill, and overcoming shortages. The first presents a consideration of the nature of skill, what is skill, muscular skill, sensory skills, thinking skills, practical example, how skill is acquired, analyzing skill, some training principles. The second section covers selection and training, inventory of present force, work analysis, case study, using job description, time study analysis, upgrading set-up work, carrying out the training, how effective is quick training, apprentice training, motivation and supervision. An appendix presents detailed figures compiled to give a complete picture of the time required to secure an efficient working force.

Monsanto Chemical Co., St. Louis, has published a 54-page booklet on phosphorus-iron alloys which contains abstracts of patents relating to phosphorus as an alloying element in steel, and a list of iron and steel patents.

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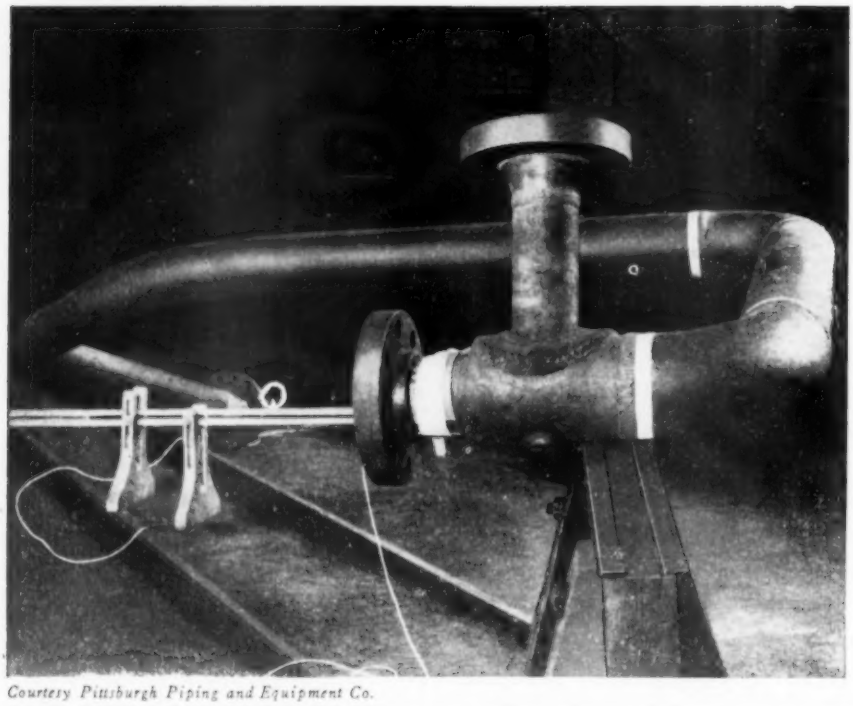

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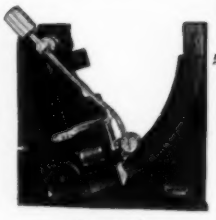
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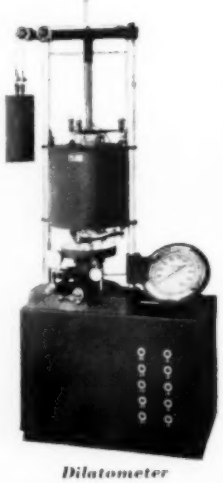
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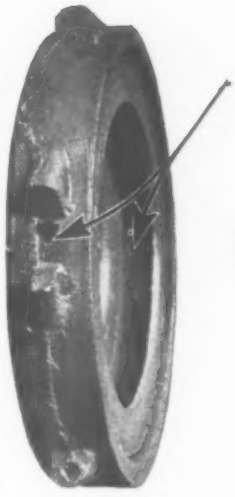

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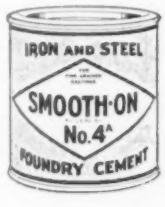

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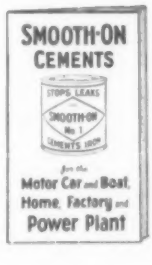

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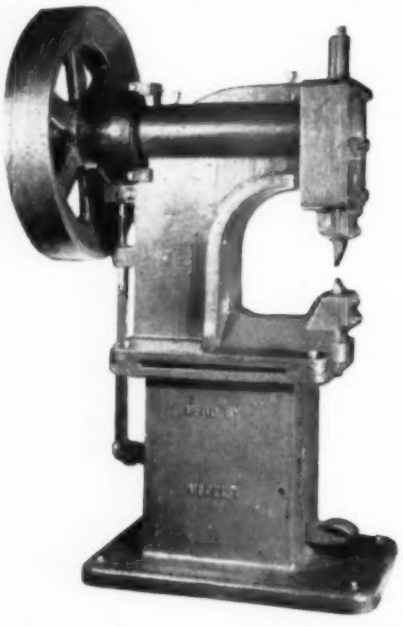

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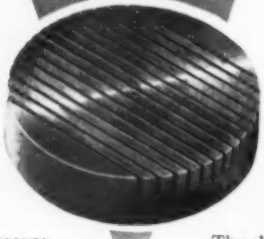

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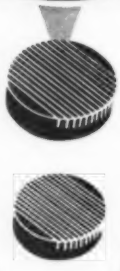

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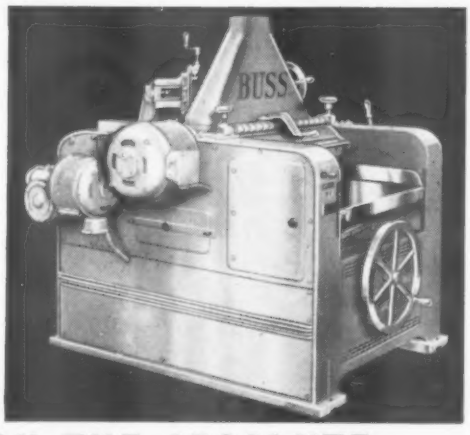

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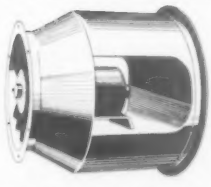

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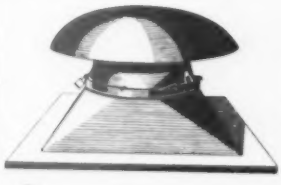

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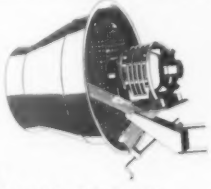

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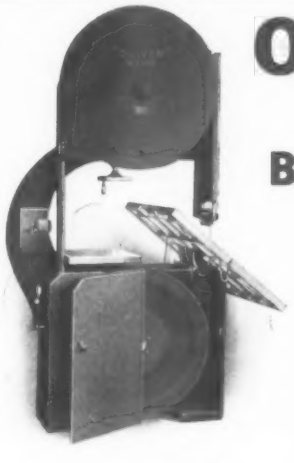

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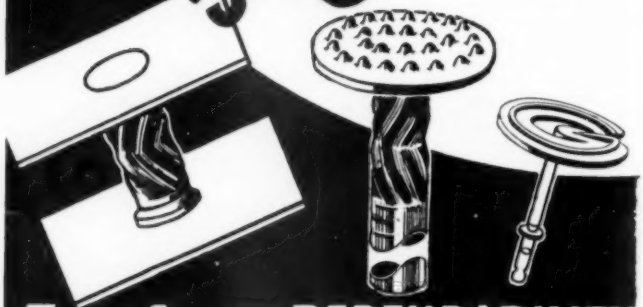

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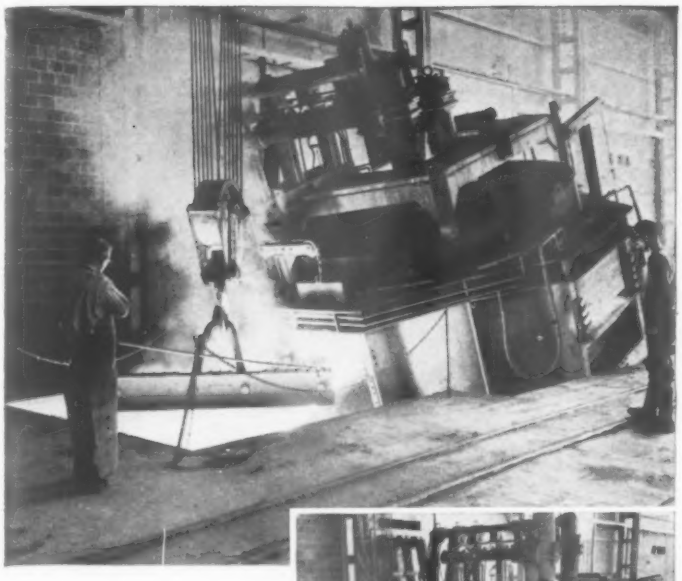

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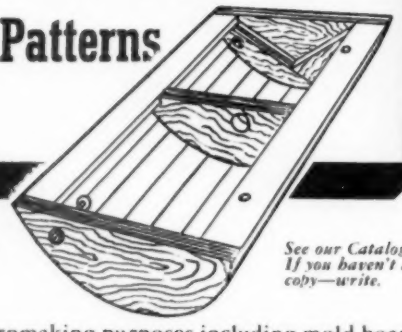

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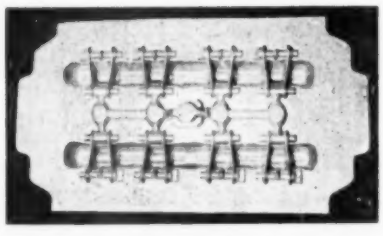

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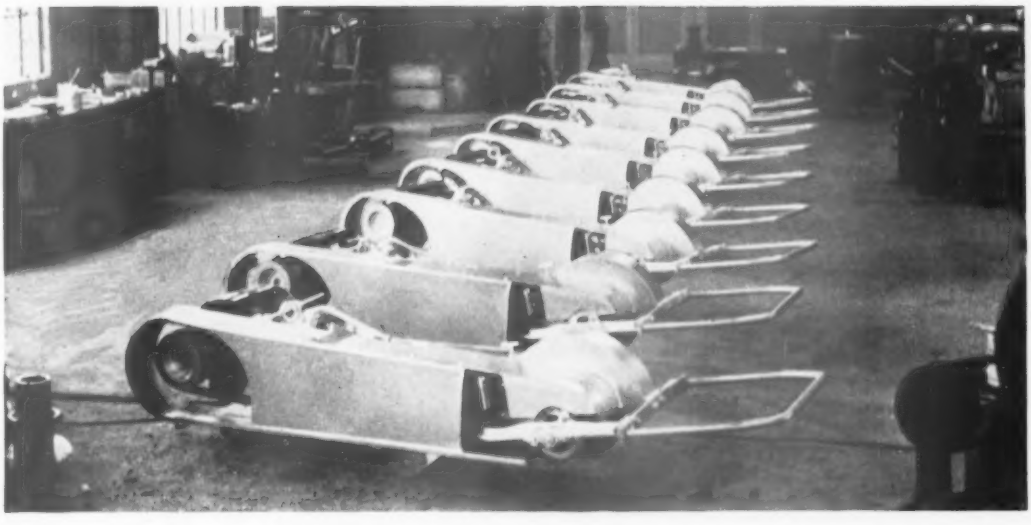

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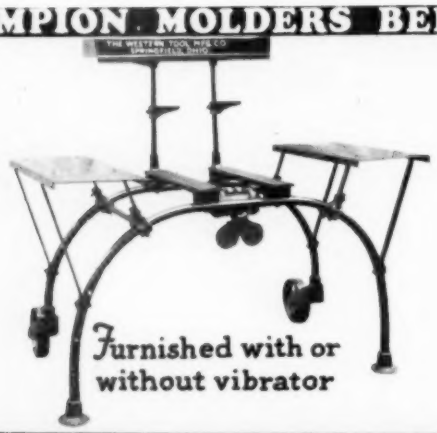

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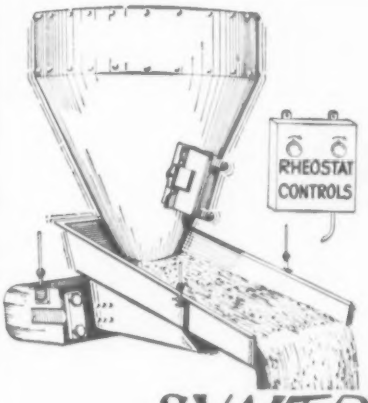

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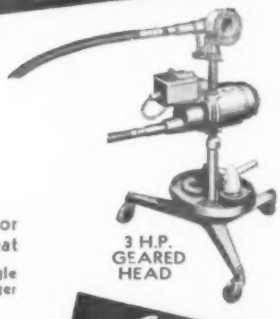

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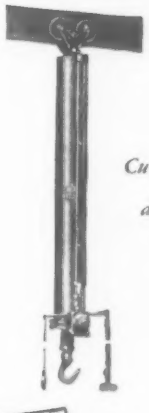

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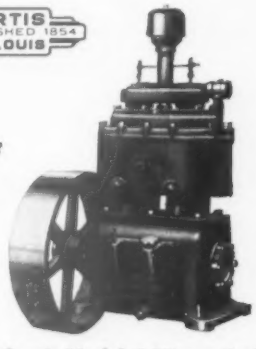

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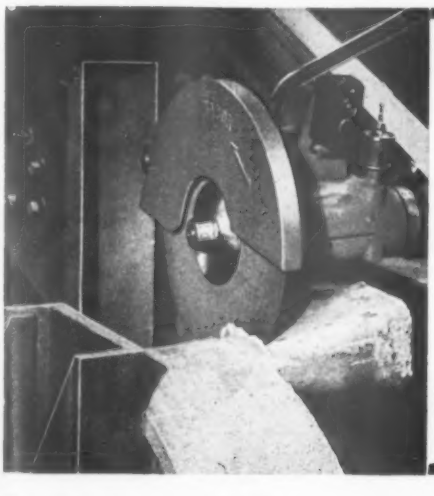

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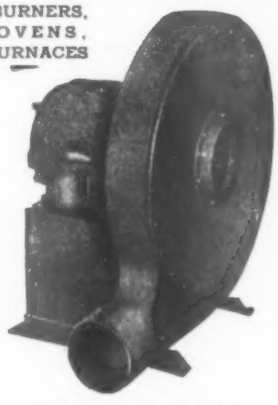

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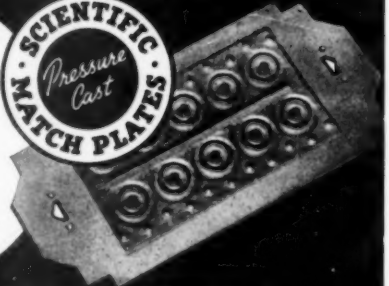

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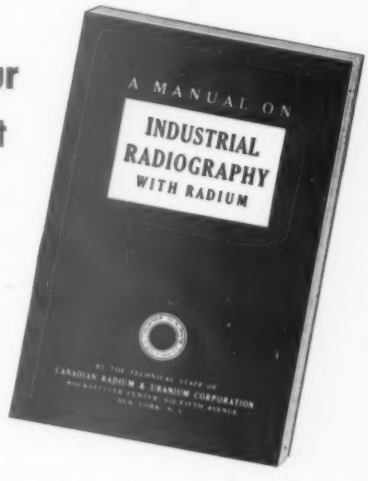

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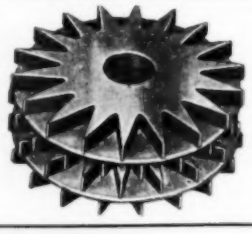

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⅜"	½" x ¾"	No. 19 "
⅜"	½" x ⅞"	No. 18 "
½"	½" x ⅞"	No. 18 "
½"	⅝" x ⅞"	No. 18 "
⅝"	⅝" x ⅞"	No. 16 "
⅝"	¾" x ⅞"	No. 16 "
¾"	⅞" x 1"	No. 16 "
⅞"	⅞" x ⅞"	No. 16 "
1"	1" x 1⅛"	No. 15 "
1⅛"	1⅛" x 1⅛"	No. 15 "
1¼"	1¼" x 1⅜"	No. 13 "
1⅜"	1⅜" x 1⅜"	No. 13 "
1½"	1½" x 1⅝"	No. 12 "
1⅝"	1⅝" x 1⅝"	No. 12 "
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One type E Sly Sand Blast Table 8' diameter.
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STEEL FOUNDRY SPECIALISTS

We have recently placed into partial operation a large steel foundry which will require approximately 6000 employes, and we are now looking for a few men to join our organization who have the ability to handle, solve, and follow through production problems in the various departments.

Qualifications for this work are, educational background in mechanical engineering, or mechanical experience; experienced in handling men, and in working with men and getting things done; steel foundry experience preferred but not necessary.

Only persons should apply who are not now engaged to their fullest extent in war work.

CAST ARMOR PLANT
AMERICAN STEEL FOUNDRIES
3200 SOUTH DICKEY ROAD
EAST CHICAGO, INDIANA

SHIPPING CLERK WANTED

Experienced shipping clerk for brass foundry. Government work. Steady employment. Address: Box 960, The FOUNDRY, Cleveland.

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Young aggressive man between 35 and 48 who has leadership and organizing ability as well as complete foundry knowledge to start as assistant superintendent, gray iron jobbing foundry, making castings ranging up to approximately 7000 lbs. Must have thorough knowledge of modern cupola, core, moulding, foundry, and pattern experience. Also, opportunity to learn alloy nonferrous metal casting business later and this position holds great post war possibilities as company well established in their field with large expansion planned for after war. Location tri-state area Pittsburgh. State experience, salary and qualifications in replying. Also, if accepted, how soon could you report. Address Box 950, The FOUNDRY, Cleveland.

SUPERINTENDENT

Wanted practically trained man, middle aged, to take entire charge of gray iron foundry department of firmly established Pennsylvania machinery builder doing medium and heavy work on own products on job shop basis. Excellent permanent opportunity for man with the right experience and personality. Give complete resume of past connections and education, stating salary desired, etc. Address: Box 954, The FOUNDRY, Cleveland.

STEEL FOUNDRY FOREMAN

Desire foreman or assistant foreman with previous experience. However, man with steel molding experience or background and capable of rigging, gating or risering jobs would be considered. Address Box 937, The FOUNDRY, Cleveland.

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Steel castings. Must be specialist on gating and rising. Capable of organizing jobbing work and handling men in completely modern plant. Permanent position, high salary. State full experience, give complete references and starting salary in first letter. Address: Box 978, The FOUNDRY, Cleveland.

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Experienced—to take charge of production molding on squeezers and molding machines. Splendid opening for a good man. State age, experience, family status and salary expected in first letter. Address: THE WESTERN FOUNDRY COMPANY, 3634 SOUTH KEDZIE AVENUE, CHICAGO, ILLINOIS.

Help Wanted

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To act as assistant foreman foundry department. (Approximately 150 molders). Must know gating, rigging and production conveyor molding. Give experience, references and age. This is a permanent position. Address: Box 961, The FOUNDRY, Cleveland.

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Assistant superintendent for New England Jobbing Iron Foundry of moderate size. Will have opportunity to learn electric furnace operation. Address: Box 969, The FOUNDRY, Cleveland.

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To act as manager's assistant in Production Department. Must be able to plan production in plant. Permanent position in an expanding industry. Address: Box 968, The FOUNDRY, Cleveland.

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Excellent opportunity for Graduate Engineer to act as Administrative and Technical Assistant Chief Metallurgical Engineer; large New York Metropolitan company manufacturing aeronautical equipment. Ten years practical experience in ferrous and nonferrous work essential. American citizens only. If using full skill on war production work, don't reply.

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Union shop
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For one ton acid electric furnace, carbon and alloy steel. Not war job. Foundry located in upstate New York. Give complete details as to qualifications, salary desired, age and references. Address Box 935, The FOUNDRY, Cleveland.

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One to act as **foreman.** Must be a practical foundryman and experienced in bronze and aluminum. Western New York Area. Write giving experience, references, and salary in first letter. Address Box 921, The FOUNDRY, Cleveland.

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Wanted for up-state New York foundry producing small and medium-sized steel castings, to take charge of 12 molders. Excellent opportunity for a practical foundryman who wants a war as well as a post-war position in old established firm. Address Box 934, The FOUNDRY, Cleveland.

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To take charge of up-to-date, modern, brass foundry with 50 employes. Located in Southern California. Large production of small brass castings on 12 x 8 flask equipment. Post-war prospects excellent. Company established 25 years. State full past experience and employment record. Also state rate expected. Address: Box 957, The FOUNDRY, Cleveland.

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Experienced on gated and mounted work. Steady year round work. Town ten thousand. Good fishing—good community. Send complete information. Address: GRAND HAVEN BRASS FOUNDRY, GRAND HAVEN, MICH.

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Molders and Coremakers for Gray Iron Foundry producing machine tool and heavy castings; also pattern maker capable of checking patterns and cores. Steady work. Address: CENTRE FOUNDRY & MACHINE COMPANY, WHEELING, WEST VIRGINIA.

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Experienced steel foundryman. Must be familiar with sand control, molding, gating, risering, etc. of steel castings of various sizes. Good opportunity. 100% war work—Pittsburgh district. Address: Box 981, The FOUNDRY, Cleveland.

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Foundry instructor who has had twenty-six years of practical experience in the trade in various capacities, desires a position. Forty-six years old, graduate of Wentworth Institute and of McLain's Systems. Completed ESMWT courses at California Institute of Technology as follows: Physical metallurgy and metallography laboratory. Address: Box 956, The FOUNDRY, Cleveland.

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Stove, Furnace, light or medium Machine Castings. Fourteen years in charge of Core Rooms. 12 years Foundry Superintendent or Foreman. Molding Machine, Rigging and Cupola experience. Fourteen months teaching foundry practice. Cincinnati district preferred. Available April 15, 1943. Address: Box 975, The FOUNDRY, Cleveland.

Classified Advertising

Positions Wanted

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Thirty years' foundry experience of which has been superintendent and general foreman for twenty years on jobbing machinery, castings and practical foundryman in every detail. New Jersey preferred. Best reference. Address Box 826, The FOUNDRY, Cleveland.

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Wants position. Age 43. Now in Ohio. Has had 26 years' experience as core maker and foreman. Expert in production work. Address Box 941, The FOUNDRY, Cleveland.

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With 34 years' experience, 14 years as foreman and 20 years as molder. Age 54. American born. Jobbing work. Good actual experience on all classes of molding machines and sand slingers. Address: Box 951, The FOUNDRY, Cleveland.

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If your production is low and your loss high, if you feel that general inefficiency prevails in your foundry, let me explain an inexpensive method. Address: Box 959, The FOUNDRY, Cleveland.

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With many years' experience in iron jobbing foundry. Steady and reliable. Address Box 938, The FOUNDRY, Cleveland.

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This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details.

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GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

Wanted-To-Buy

WANTED

The following used equipment

A 36" x 42" American Foundry Equipment Company Wheelabrator Tum Blast OR Pangborn No. 14 type "GK" Rotoblast, with or without loading device, but complete with ventilating and dust collector; 1—2000 pound, gear operated reservoir ladle; 1—heavy duty double end snagging grinder, direct connected motor drive—220 V-3 phase—60 cycle capacity 16 x 3 x 1¼ wheels. Greater capacity would be considered. We want good used or rebuilt equipment. Equipment must be in first class condition. Call or write **Kelly Foundry & Machine Co., Elkins, West Virginia, Phone 90.**

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One No. 0 Simpson Intensive Mixer with worm gear, speed reducer and magnetic line starter.
CENTRAL BRASS MFG. CO., CLEVELAND, O.

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Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

WANTED

Used Simpson or Lancaster intensive mixer, four or five foot pan, motor drive. Address: Box 962, The FOUNDRY, Cleveland.

WANTED

Bore Rod Straightener to straighten rods one inch diameter. Address: Box 963, The FOUNDRY, Cleveland.

Foundry Work Wanted

FOUNDRY CAPACITY AVAILABLE

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STEEL FOUNDRY BUILDING
Size 133 x 133

Railway Siding—72" Whiting Cupola Complete
Formerly Equipped with Heavy Crane
61' Main Aisle—36' Lean-to Both Sides
This building can be dismantled.

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Foundry equipped to make castings from 25 lbs. to 20000 lbs. Foundry building constructed of Brick, Steel & Concrete with Asbestos Sheet Roof. Three story brick pattern storage building. One city block of property with side-track. Now working. Located in Eastern Ohio. Address: Box 970, The FOUNDRY, Cleveland.

FOR SALE

Grey Iron and Brass Foundry equipped for small to medium weight castings, actual production on defense work with high rated orders, located in a commercial center of New England. Could furnish hand labor to the buyer. Address: Box 971, The FOUNDRY, Cleveland.

Foundry in Eastern Massachusetts completely equipped with two 5-ton cranes, large core ovens, compressors, one 48" and one 36" cupola, and all necessary equipment. Also pit fires for nonferrous metals. Will consider lease with option to purchase. Address: Box 965, The FOUNDRY, Cleveland.

FOR SALE

NONFERROUS FOUNDRY: YEARLY PRODUCTION AVERAGING $500,000; OLD AND WELL ESTABLISHED BUSINESS. DETROIT AREA. ADDRESS BOX 895, THE FOUNDRY, CLEVELAND.

For Sale

FOR SALE

1 72" Whiting Cupola.
1 B.F. Sturtevant No. 7 Blower.
1 Buffalo Floor Scale 3500 lbs. cap.
1 Automatic Top Polishing Machine No. 27-L. Made by Excelsior Machine & Tool Co.
1 Cycloidal 34" Twin Fan.
1 South Bend Lathe 12" Swing 7 ft. Center to Center.
1 100 H.P. Stewart-Warner Motor 440 Volts.
1 Taylor Spot Welder Type S-4-B 440 Volts, 60 Cycle, No. 2318.
1 No. 7 Gardner Disk Grinder Vertical type.
33 Die Trucks 48 x 26 x 6.

THE ABOVE SUBJECT TO PRIOR SALE

THE FOSTER STOVE CO. IRONTON, OHIO

REBUILT COMPRESSORS AND BLOWERS

(3) Buffalo Forge Pressure Blowers, 1200 cfm @ 11 oz., 9½" inlet, 7 x 7 outlet, driven by 7½ H.P. A.C. Motors.
450 CFM, 3500 RPM Gen. Elec. with 6.2 H.P. A.C. motor drive.

SAND VIBRATOR

Jeffery-Traylor, shaker type CVS-8, 6" wide hand deck, capacity 7 to 8 tons sand per hour; with 15 cycle, 110 volt, single phase vibrator motor generator set. Write, wire or phone.

The Motor Repair & Mfg. Co.
1552 Hamilton Ave. Cleveland, Ohio

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.
ELECTRIC—353 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEEL TANKS

9—5000 gal., 11,500 and 18,000 gal. cap.
17—1000 bbl., 4000 bbl. and 10,000 bbl. cap.

TANKS BOUGHT AND SOLD

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

One No. 6 Piqua positive pressure blower, 20" x 60"—35 ft. displ. top discharge, mounted on bed-plate direct connected to 40 h.p. Wagner 3/60/220 A. C. motor, with starter . . . used.

Mahr Mfg. Company
1709—22d St., N.
Minneapolis, Minn.

Classified Advertising

For Sale

PARTIAL LISTING OF USED EQUIPMENT

LOCATED AT OSWEGO, NEW YORK

ELECTRICAL—550 Volt

G. E. 6'-4" x 26'-2" x 1½", 12 Panel Slate Switchboard.

4—G. E. 2500 K. V. A. Transformers, Motors, Starters and Switches. ¼" x 5"—¼" x 3"—¼" x 2" Bus Bar.

WOOD WORKING—

Yates Sander, 49" x 8", Ball Bearing, 3 drum, roll feed.

Buss Mch. Wks. 44" x 60" Motor driven Cabinet Saw.

CRUSHERS—

"Williams" Crushers, Shredders and Hammermills.

1—Pipe Threader, Jarecki Mfg. Co. No. 66 1½" to 6".

Olsen 10,000-lb. Universal Testing Machine.

WATERFALLS PAPER MILLS

EAST SENECA STREET, OSWEGO, N. Y.

TELEPHONE 1452

EQUIPMENT IN STOCK

GUARANTEED IMMEDIATE SHIPMENT

MISCELLANEOUS ITEMS

(1)—No. 60 Crucible Fisher Stationary Furnace, oil fired with new lining and cover.

(2)—1⅝" cap. Shuster Power Sprue Cutter.

(4)—large flask vibrators.

(1)—10-HP. Black & Decker, double end 230-VDC Grinder, capacity 24" wheels.

AIR COMPRESSORS & BLOWERS

(1)—12 x 12 Chicago N.S.B. 375-CFM. @ 100 lbs. with idler, unloader and lubricator.

(1)—12 x 10 Penna. 365-CFM. @ 100 lbs. belt drive, 60-HP. C.W. slip ring motor, 220/3/60-cy.

(1)—No. 4 Wil. Green Positive Pressure cap. 13-cu. ft. per rev.

ELECTRIC MONORAIL HOISTS

(30)—½ to 5-ton, 1 and 2 motor, Fl. and Cage operated, 230/440-volts, 3-Ph. 60-CY. 110 and 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

(1) to 50-tons cap. 18' 0" to 91' 0" span, 220/440-volts, A.C. and 230-VDC. We operate the largest crane rebuilding plant in the country. Send us your specifications for Cranes, Electric Monorail Hoists, Crane Motors, Standard Motors, Steel Buildings and Runways. We can quote you on equipment rebuilt to your specifications.

T. B. MacCABE CO.

4304 Clarissa St. Philadelphia, Pa.

For Sale

FOR SALE

One No. 7, 60" dia. 30' 0" high Whiting Cupola One 46" dia. 30' 0" high. Both complete with blowers. Address Otto Biefeld Company, Watertown, Wisconsin.

FOR SALE

Three Osborn jolt squeeze rollover pattern draw molding machines, type 332. Address Box 931 The FOUNDRY, Cleveland.

FOR SALE

Four Tabor squeeze molding machines, table 28" x 18", serial Nos. 5368, 8194, 8882 and 8883. One E. H. Mumford Company squeeze molding machine, table 28" x 18", serial No. 354.

SPROUT, WALDRON & COMPANY
MUNCY, PENNSYLVANIA

REBUILT

BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY

406 N. Peoria St. Chicago, Ill.

SPECIAL DEFENSE BARGAINS

Blowers-Fans-Exhausters for Dust, Ventilation, Combustion, Rotary, Multistage, Multivane for all services, hundreds in stock, send specifications for your need.

Air Compressors, sizes up to 50 CFM in stock, larger sizes available, also Air Receivers.

Furnaces for Brass and Aluminum Melting—Hausfeld Tilting Brass or Aluminum open flame, 400 lb. brass cap.; Booth Electric 725 lb. brass cap. with instruments. Stationary Furnaces, swing top for crucibles No. 60 to No. 150 and open top for iron pots up to 300 lb. aluminum.

Molding Machines—"Berkshire" 34" wide stationary air squeeze. "Tabor" 8" cyl. air squeeze "Battenfeld" (Johnston & Jennings) stationary jolt squeeze; 5 in stock, Adams—Stationary hand squeezers 48" wide 2 in stock. Mumford—Stationary Air Squeeze 14 x 18" platen.

Crane Ladles—⅝ and 3 tons cap. Rim Pour.
1—25 H.P. Diesel Engine, horizontal.
1—Beardsley & Piper Stationary Gyratory sand screen and conditioner size 36" x 59"—1 H.P. Ball Bearing 3/60/220 A.C. Motor, Vee Belt Drive.

Sand Blast Barrel—Macleod 36 x 36" for belt drive, Three friction clutch pulley.

Sand Blast Room—All steel 9'-10" x 20'-9" operators grilled table 3' x 10', down draft dust exhaust—8' ceiling. Air inlet thru ceiling with 1000-lb. sand capacity pressure generator tank.

Core Oven—Small portable 4 separate shelf compartments each. 20" deep x 32" wide x 6" high for gas fuel.

We have many attractive machines listed. Send your inquiry with full specifications for your AIR & FOUNDRY needs.

CLIFTON MACHINERY CO.

1023 W. 6th, CINCINNATI, O.

For Sale

FOR SALE

1—Sly round tumbling barrel 44" x 60".
1—Sly round tumbling barrel 48" x 60". Complete with shaft, motor, etc. In good condition; on foundation at present. Address: Box 966, The FOUNDRY, Cleveland.

FOR SALE

Electric Steel Melting Furnace, 4000 lb. holding capacity. Including only equipment which is integral part of furnace and mounted on it. Furnace may be inspected in operation. Giving good results. Address: Box 964, The FOUNDRY, Cleveland.

FOR SALE

One No. 4 Whiting cupola in good condition. Reasonable. Write KEEN FOUNDRY COMPANY, GRIFFITH, INDIANA.

FOR SALE

3—Model—AA Sand Cutters.
1—HP Sand Cutter.
1—NC Royer.
1—Portable Howe Platform scales. (4 ft. square platform).
1—No. 4 Root Positive Blower.
7—JW 275 J Osborne Jolt Squeezers.
1—Pridmore 24" x 8" draw.
2—Pridmore 14" x 6" draw.
2—Milwaukee Jolt Squeezers.
6—Osborne J 75 Jolt Squeezers.
4—International JS 2 Jolt Squeezers.
3—30 x 48 Sly Tumbling Mills. (Motored with 5 horse motor Jones reducer individual drive).
1—Newton cupola 40" shell with Sturtevant Blower.
1—Sturtevant No. 13 Positive Blower with Morse Chain Drive and 125 hp G. E. Induction Motor BLOWER—High pressure rotary blower. Bottom inlet, 29" d. Top outlet. Blower chamber (oval section) 75" wide x 68" high x 71" long. Two 7" D. bearings each end. 20" long bearing caps plus 14" gear case one end, and 14" pinion overhang other end, make total length app. 12 ft. Wt. (without motor) app. 30,000 lbs. Rated when new 13400 C.F.M. at 18 oz. pressure when turning 200 r.p.m.—require 125 hp.
DRIVE—12" face 1½ pitch Morse Chain 104 pitches long. 19 tooth motor pinion. 55 tooth driven sprocket.
MOTOR—G. E. induction motor 125 hp type 1-154, 440 v-3ø, 60c. 585 r.p.m. Model No. 9564, Serial No. 4025601.
CONTROLS—G. E. T108 Controller No. 560087, 15 Resistor Bank.
1—No. 1 Demmler Core Blower.
1—Electric Melting Furnace—Heroult type Electric Melting Furnace, originally designed for 2000 lbs. to 2500 lbs. capacity. This furnace shell was later re-designed for 3300 lbs. capacity (approximately 12 to 14 tons per day), complete with transformers (2200 volt primary—90 to 110 secondary) and controls. Automatically operated electrodes, hand operated, gear driven, tilting device. One extra ladle, large quantity of 3" electrodes, set of ingot molds, one electric pump for the water system and piping for water cooling, excellent condition. 3 phase. Total capacity consumption of Power 600 K.W.
1—26" Band Saw.
1—Coleman Draw type Core Oven.
1—Molene Hand Squeezer.
Core Plate, Aluminum 79—16 x 35.
Core Plate, Composition 100—7½ x 32.
Aluminum Ribbed Core Plates—

6"	x 6"	x ¼
12"	x 6"	x ¼
5½"	x 21½"	x ¼
11"	x 21½"	x ¼
9"	x 14"	x ¼

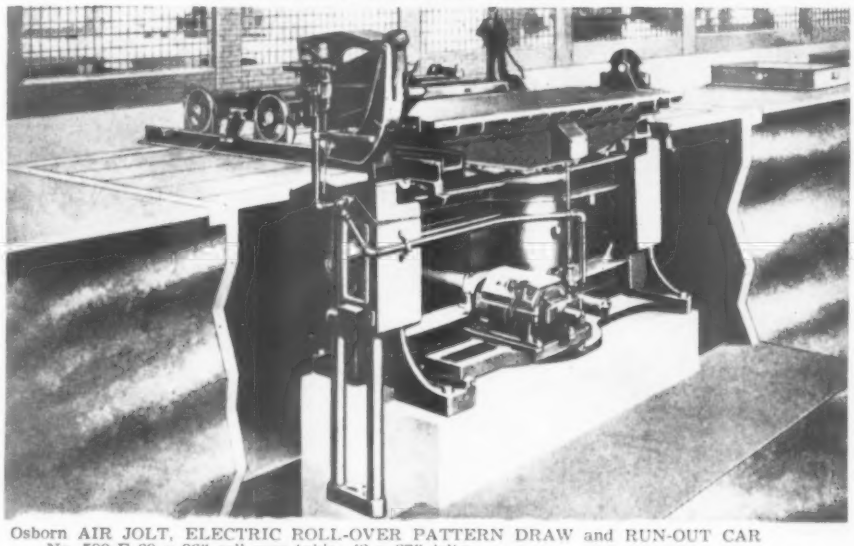
3—300 KVA. 7200-440V transformers. These transformers are in first class condition.
A shot or sand blast room approximately 8' x 10' x 7' with a 6' diameter turn table with elevator, sifting and pit equipment. Practically new.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 LAKE ST. KALAMAZOO, MICH.

SCULLY Reconditioned Foundry Equipment

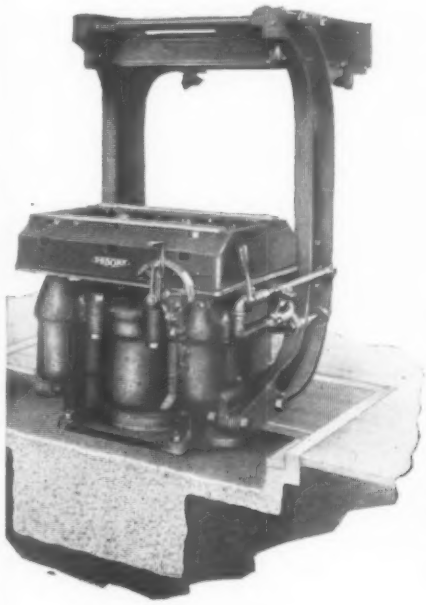
★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN, NEW MACHINE SHOP

OSBORN MOLDING MACHINE



Osborn AIR JOLT, ELECTRIC ROLL-OVER PATTERN DRAW and RUN-OUT CAR
No. 509-E 60 x 96″ roll-over table, 42 x 87″ jolter.
No. 513-E 36 x 124″ roll-over table, 36 x 112″ jolter.

OSBORN JOLT SQUEEZE & POWER STRIP



No. 703 OSBORN
(Similar to above excepting with roll-off)

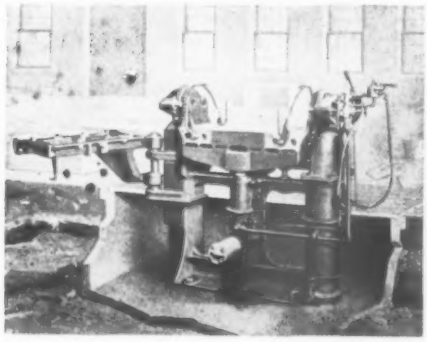
No. 703-6 Osborn jolt squeeze and strip, 21 x 28″ table, stationary. Length of opening in lifting frame 34″, 6″ pattern draw, 8″ cyl. dia. 1000 lbs. jolting cap. @ 80 lbs. press. Distance from lifting frame to squeeze head 24¼″, flask length 44½″ with roll-off conveyor.

No. 703-5 Osborn, same as above, excepting 17 x 35″ table.

HERMAN Independent Turn-Over and Pattern Drawing Device

60 x 84″ roll-over, 60 x 72″ bumper, 10,000 lbs. cap. @ 80 lbs.
60 x 72″ roll-over, 60 x 72″ bumper, 10,000 lbs. cap. @ 80 lbs.
46 x 56″ roll-over, 40 x 50″ bumper, 3000 lbs. cap. @ 80 lbs.
40 x 62″ 3000 lbs. Series 18″ cyl. roll-over, equipped with 45° T.D. Arms and 4″ longer than standard extension—40 x 58″ Bumper, 22″ draw, pneu. Flask Clamps and No. 3 Electro pneu. timing device.

OSBORN Jolt Roll-Over Pattern Draw Molding Machines



No. 403-W jolt roll-over pattern draw, flask cap 52 x 36″ pattern draw 12″, 1300 lbs. cap. @ 80 lbs. press., with swing-out Mold Table.

No. 404 jolt roll-over pattern draw, flask cap 40 x 54″ pattern draw 15″, 1500 lbs. cap. @ 80 lbs. press. with run-out Mold Table.

No. 405, flask cap 50 x 64″—pattern draw 18″, 3000 lbs. cap. @ 80 lbs. press. with run-out Mold Car.

MOLDING MACHINES

No. 49 Davenport jolt roll-over draw, outside flask cap. 50 x 72″ pattern draw 18″—4500 lbs. cap. @ 80 lbs. pressure, jolt cyl. dia. 14″.

INTERNATIONAL MOLDING MACHINES

Type "F" 49 x 16″ draw, comb. jar ramming, power turn-over and power draw, fitted with air equalizers, rollers in the draw section and hand operated core box clamps (rollers can be readily removed) jar plate 100″ long, 6000 lbs. cap. @ 80 lbs. pressure.

International Type "F" comb. jar ramming power turn-over power draw, 26 x 12″ draw, 900 lbs. cap.

International Type "F" 30 x 12″ draw, 1800 lbs. cap. @ 80 lbs. pressure.

AMERICAN SANDCUTTERS

Model "AA" size 72, 60″ cutting cyl. 72″ between tractor wheels, complete with 7½ HP AC Motor, Cable and Reel.

Cleveland Model "B" Type 5-55, 55″ spiral cutting cyl. 26″ dia.—66″ between tractor wheels, equipped with 3 Cleveland Elec 220V AC Motors, Cable and Take-Up Reel.

Cleveland-American (similar to Model "K") 84″ spiral cutting cyl., 36″ dia., 92″ between tractor wheels, 5″ face—equipped with Cleveland 3-phase 60 cycle 220V AC Motors, Cable and Take-Up Reel.

NO. 2 DEMMLER CORE BLOWING MACHINES

Osborn "Little Wonder"
CORE ROLL-OVER MACHINES

No. 45-P, Length O/A 24″, Width O/A 20″, pattern draw 8″, height of roll-over table from floor 28″.

No. 46-P, Length O/A 32″, Width O/A 24″, pattern draw 8″, height of roll-over table from floor 24″.

No. 47-P Length O/A 40″, Width O/A 22″, pattern draw 8″, height of roll-over table from floor 24″.

60" SCHWARTZ Furnace, teapot type, oil fired, hand tilting.

MISCELLANEOUS

American Pulverizer Type "S" CORE CRUSHER 30 x 35 opening on base plate direct connected to American Elec. 35 HP 3/60/440V 570 RPM AC Motor.

No. 47 Ransom FLOOR STAND GRINDER 24 x 4″ wheels, 81″ arbor 1¾″ dia., equipped with 10 HP 220V DC Motor.

No. 1½, double muller, 54″ dia. Simpson Mixer complete with Reducer.

Ing.-Rand 12 x 8 ER-1 Compressor, 300 cu. ft. displ., 300 RPM, low pressure type, 20-30 lbs. pressure with lubricator and unloader.

SCULLY MACHINERY & EQUIPMENT CORP.

(Formerly – Foundry Division of Scully-Jones & Co.)

2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO, ILLINOIS

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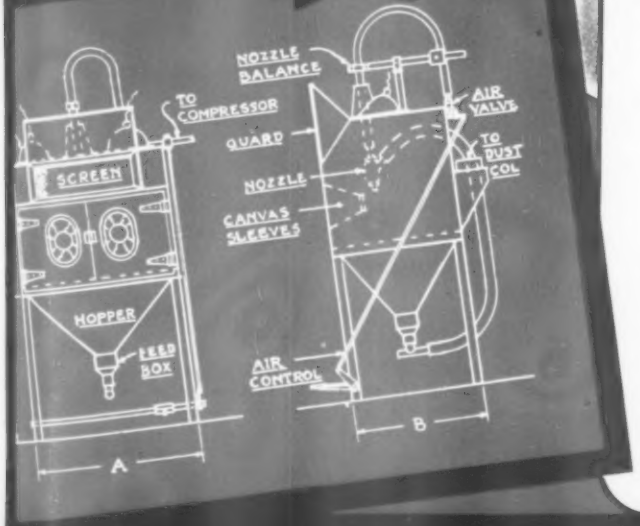
HARD-HITTING

Fast Hair-Fringer Action



Parsons

SAND BLAST CABINETS

Parblast Cleaning Cabinets are small, rugged and compact, yet, pack a powerful bit of concentrated action that hits hard and clean, producing surface finish equal to that of far more expensive units. These machines with their remarkable flexibility are adaptable to a wide range of work, paying for themselves in no time. Operation is practically continuous, as it is not necessary to stop for abrasive refilling. Cabinets are made in standard sizes. However, they can be "Tailor Made" to suit your individual requirements. These units are simple and easy to operate; any "rookie" can handle them without special training. They operate on pressures from 20 pounds up, and handle either sand or steel abrasives.

Parson's Blast Cleaning Equipment including Parblast Rooms, Oscillating Blast Barrels, and Oval Bag Dust Arrestors, mean better and more thorough cleaning for less money. Send for free literature on our complete line of cleaning room equipment.

PARSONS *Engineering* CORP.

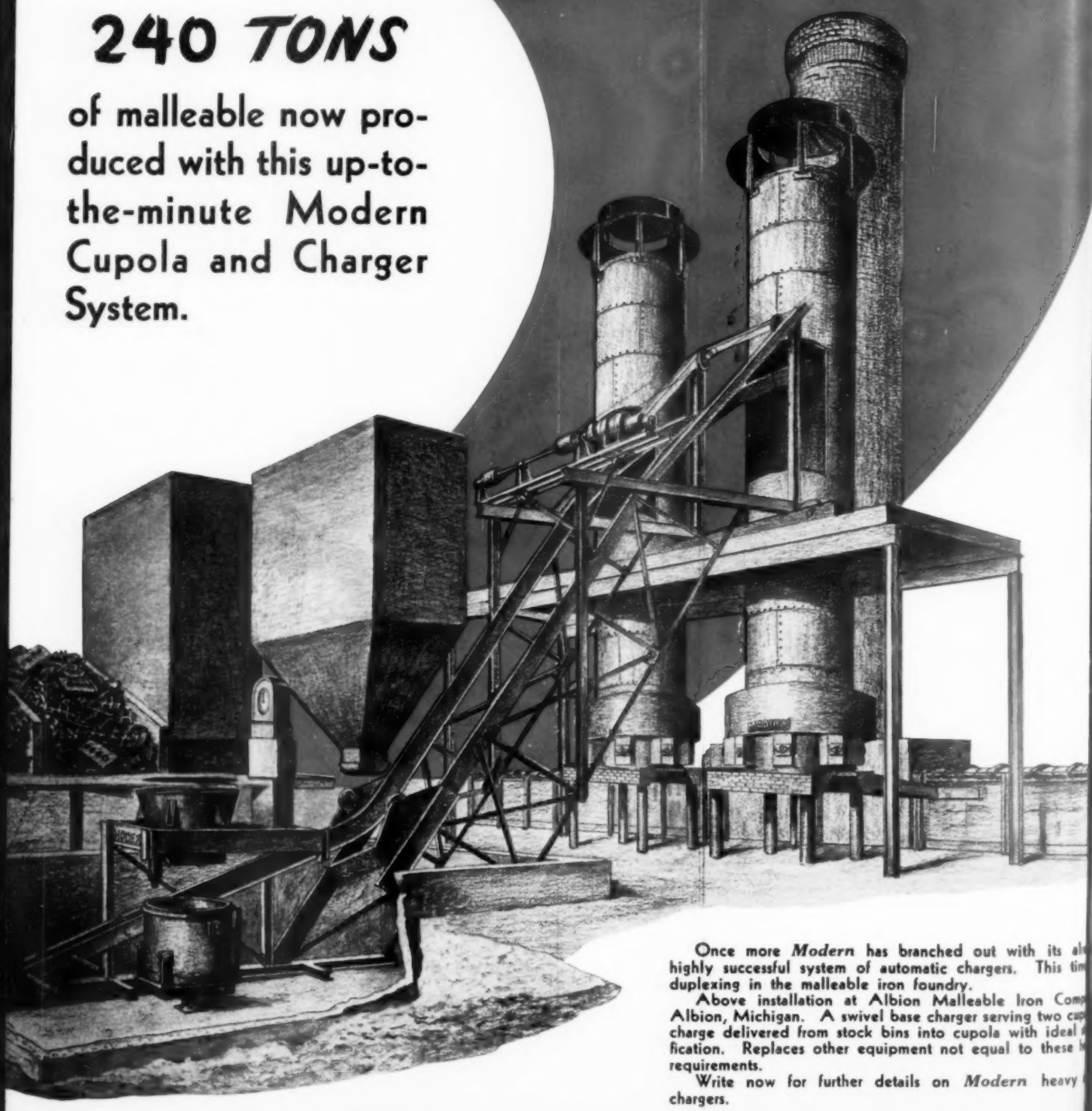
545 EAST 79TH STREET • CLEVELAND, OHIO

MODERN MELTING

NOW EMBRACES DUPLEXING IN MALLEABLE IRON FOUNDRIES.

240 *TONS*

of malleable now produced with this up-to-the-minute Modern Cupola and Charger System.



Once more *Modern* has branched out with its al highly successful system of automatic chargers. This tim duplexing in the malleable iron foundry.

Above installation at Albion Malleable Iron Comp Albion, Michigan. A swivel base charger serving two cup charge delivered from stock bins into cupola with ideal f fication. Replaces other equipment not equal to these h requirements.

Write now for further details on *Modern* heavy chargers.

Cupolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles • Improved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems For Metal & Mold Handling • Furnace Charging Cranes • Electric Mold Skin Driers

MODERN EQUIPMENT

PORT WASHINGTON, WIS.
DEPT. 184

"The Arsenal of Democracy"

DETROIT

Photo by Ewing Galloway, N. Y.

• • • war industries operating at top speed . . . foundries producing castings of steel, iron, aluminum, magnesium and brass, and other vital parts for our tools of war.

• • • Stevens Foundry Supplies are in the thick of the fight in this great drama of production. Foundrymen in Detroit KNOW that the name STEVENS is synonymous with the best products the industry offers . . . manufactured, literally speaking, "right in their own back yard", for over 60 years.

• • • and everywhere . . . foundrymen realize more and more every day that STEVENS FOUNDRY FACINGS help turn out BETTER CASTINGS with LESS LABOR—LESS SCRAP, and at lower total cost.

• • • Repeat orders . . . from all sections of the Country—bear mute testimony to the SATISFACTION and SERVICE you get from STEVENS.

Inquiries concerning our products will be cheerfully and promptly answered by men who KNOW THIS BUSINESS AND YOURS.

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INGOT MOLD CONVEYORS

SPEED PIG CASTING of CRITICAL METAL

Section of horizontal run of conveyor showing pouring from one of five melting furnaces. The ingots are cooled on the conveyor, which travels at varying speeds to suit production, and are automatically discharged over head end of conveyor.

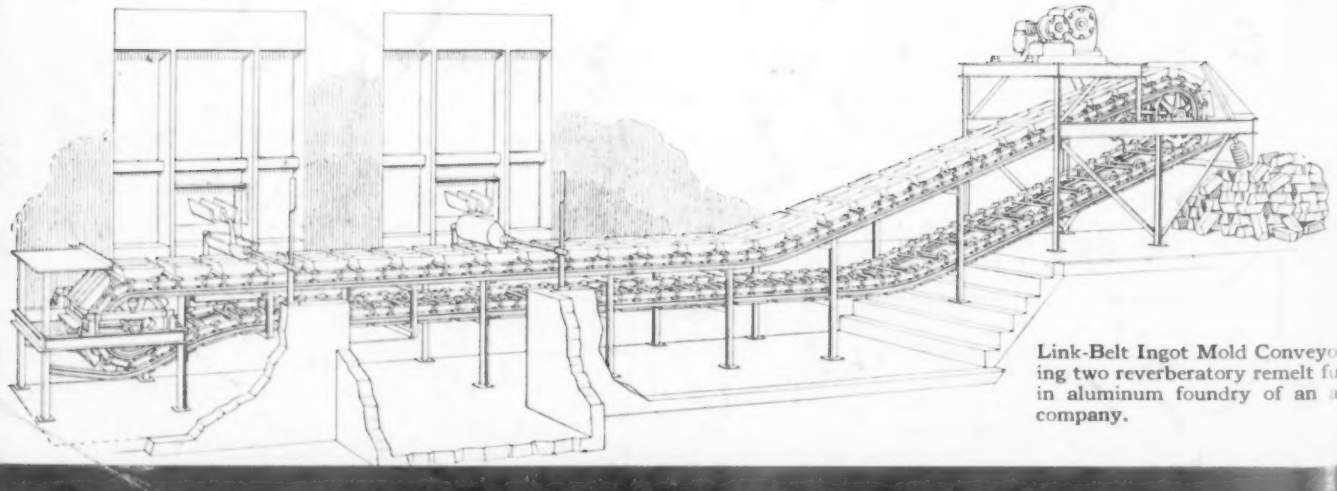
Self Contained Units Put Pouring Cooling of Brass, Lead, Aluminum Magnesium Ingots on a Continuous B

Hand lifting and carrying of ladles to and molds is eliminated by these Link-Belt conv units, which carry the molds through the p ing operation. More uniform ingots are with pouring, cooling and discharge ma continuous operation. Made in various de and capacities to produce practically any ingot and to handle as low as 1,000 lbs. per of aluminum and up to 20,000 lbs. per h Conveyors can be applied to serve one series of furnaces, and arranged with e automatic or manual pouring devices.

LINK-BELT COMPANY

Chicago, Philadelphia, Indianapolis, Atlanta, San Francisco, Toronto

Two views of a Link-Belt Ingot Mold Conveyor for lead. This is a portable, self-contained unit with molds of malleable iron, carried on "SS" type steel roller chain.



Link-Belt Ingot Mold Conveyor ser ing two reverberatory remelt furnac in aluminum foundry of an aircra company.

LINK-BELT CONVEYORS